The Builder.

No. CXI.

SATURDAY, MARCH 22, 1845.

WE have received from several quarters an inquiry to the following effect:—"I am about to fix the shop-fronts to some houses commenced before the 1st of January last, and admitted up to this time not to be within the control of the new Act. Due notice was given to the district-surveyor under the old Act, and I intend to carry out the plan and elevation to which he then assented. Is it necessary I should now give him notice under the new Act, and make my shop-fronts in accordance with its provisions?"

On inquiry we are told, that the district-surveyors have obtained information that this course is to be insisted on. They are advised, we learn, that the provisions in schedule E, entitled "Wooden shop-fronts and shutters," apply generally to *all buildings, whether already built or not;* and in regard to already-built houses, that all projections specified in the same schedule, as not forming part of the external wall, if not *completed* before the 1st of January, must be conformable to the Metropolitan Buildings Act.

Having great confidence in the opinion of the referees and registrar, we are disposed to think our information must be incorrect, or that the district-surveyors misunderstand their instructions. Whether so or not, however, we cannot avoid saying, called on as we are to express an opinion upon the question, that we do not coincide with this reading of the Act. If it were asked us, Is it *better* that all shop-fronts now to be put up should be in accordance with the provisions of the new Act than as heretofore permitted? we should say certainly yes; insomuch as those provisions are for the public safety. Party-walls are insufficient to prevent the spread of fire if there be a continuous wooden entablature to carry it from house to house; and the clause in the new Act which provides that this communication shall be cut off by the interposition of some incombustible material or otherwise, has been long called for.

But this is not the question now raised. The question simply is, whether or not the provisions of the Act which relate to shop-fronts extend to houses built before the 1st of January, when the shop-front was not put up before that date? and with the greatest deference to authorities, and a proper consciousness of the possibility of overlooking the force of portions of a document so voluminous and so recent as the Buildings Act, we venture to express our belief that they do *not*, provided the house be made fit for use before the 1st of January, 1846. We will tell our readers why.

The fifth section of the Act (which makes the schedule referred to operative), "for the purpose of regulating the building and the rebuilding upon sites of former buildings, and the enlarging and altering of all buildings of what nature soever," enacts, "with regard to every such building hereafter to be built" (with certain exceptions named) "so far as relates to building the same, and with regard to every such building either *already* or hereafter built" (with aforesaid exceptions) "*so far as relates to the rebuilding and the enlarging or altering the same,*" that every such building shall be built, rebuilt, enlarged, or altered, in conformity with the rules and directions set forth in certain schedules, one of which is the schedule (E) in question.

From this it is perfectly clear, that if we build a new house or rebuild an old one, or if we *enlarge* or *alter* either an old or a new house, this must be done in accordance with the Buildings Act. But surely nothing here calls upon us, when we have no desire to alter, to pull down any part of an old or new structure, not in accordance with the Act, and forthwith to make it so? The provisions of the Act do not come into operation until we of ourselves begin to alter the building.

Now, the house duly commenced before the 1st of last January is, in the eyes of the law, already built; the shop-front, if shop-front were intended, and be necessary to make the house complete, is, in the eyes of the law, *already up;* and we find nothing in the Act to force us to take it down. If one shop-front has been put up, and we remove it, the case is changed, and the new front must be in accordance with the directions given in the schedule, because the Act provides that no building already built shall be enlarged or altered but in accordance with those directions.

The clause in schedule E, relating to "Wooden shop-fronts and shutters," says no more than the clause in schedule D relating to "brestsummers;" yet it is not asserted that an intended brestsummer of a house duly commenced before January 1st must be put in in accordance with the directions contained in that schedule.

It is true, that in schedule E, the fourth paragraph says, "with regard to buildings *already* built or hereafter to be rebuilt, as to bow-windows, or other projections of any kind, such projections must neither be built with nor added to any building on any face of an external wall thereof, so as to extend beyond the general line of the fronts of the houses, except so far as is hereinbefore provided with regard to porticoes projected over public ways, and with regard to projections from face-walls and shop-fronts," &c.

This refers to "projected *buildings* beyond the general line of buildings, and from other external walls;" it is so headed, indeed, and would seem to have nothing to do with wooden shop-fronts. But even this contemplates an *alteration* or *addition;* it does not enact that a bow-window, if *bonâ fide* commenced before the 1st of January, must be taken down. Such a bow-window, in the eyes of the law, is then *built*, and this clause refers only to those which are to *be* built with a new building, or added to an old one.

The longer we consider the subject, the clearer it seems to us that, as before stated, the regulations in schedule E, do not control shop-fronts forming a necessary part of buildings *bonâ fide* commenced before the 1st of last January, provided they are finished before the 1st of the ensuing January.

The correctness of this view of the question is made even more apparent, as it seems to us, by an examination of these regulations (headed "Wooden shop-fronts," &c.), for it is there further set forth, that if the street in which the shop-front is situate be less than 30 feet in width, no part of such shop-front must be higher than 15 feet. Now it may happen that a carcass was carried up before last January, in a street less than 30 feet wide, prepared with brestsummer, &c., for a shop-front (like one on Ludgate-hill for example), 18 or 20 feet high, with the concurrence, too, of the district-surveyor under the old Act. And surely that same district-surveyor would not consider himself authorized by any thing in the new Act, to prevent the completion of such a shop-front and insist upon an alteration (which would probably entail the pulling down of the upper part of the house)? because that would be a manifest injustice to the owner (who had complied with the existing law), and would be directly contrary to the evident intention of the new Act, wherein such an injustice is carefully provided against by the arrangement, that if a building were even *commenced* before the Act came into operation, the provisions of the Act should not affect it. Yet, if the doctrine said to be held by the district-surveyors be maintained, such a proceeding might unquestionably take place.

THE NEW HOUSES OF PARLIAMENT.

In consequence of inquiries in the House of Commons as to the total estimated cost of the building, the following particulars were laid upon the table by Lord Lincoln a few days ago:—

	£.	s.	d.
Sum stated by Mr. Barry in evidence before the select committee of the House of Commons of last session	1,016,924	12	9
Deduct for purchase of premises and miscellaneous expenses	90,605	6	6
	926,319	6	3
Add for alterations at Victoria Tower, &c. ..	800	0	0
And for residence of Clerk of the Crown	1,794	0	0
	928,913	6	3
Estimate of the total cost of the building, according to the latest plan approved	928,913	6	3

The works are proceeding satisfactorily, and it is asserted that the new houses will be ready in 1847.

The centre and curtain portions of the river front are roofed in. The north wing is up in readiness for the roofs, part of which are already fixed, and the remainder are being put on. The south wing is nearly up to the level of the roofs, which are prepared, and in readiness for being fixed. A considerable portion of the north flank of the building is now being roofed in, and the south flank is up to the level of the roof, which is being prepared, and will soon be ready for fixing. The remainder of the north and south flanks, together with the turrets and pinnacles surmounting them, will be completed, Mr. Barry says, in the course of the present year. The Victoria Tower is carried up to a height of 38 feet, and the clock tower is at a height of 36 feet above the ground. The House of Lords is roofed in, and the ceiling and other fittings of that chamber are in hand. The central tower is carried up to a height of 28 feet above the ground. The House of Commons is about 30 feet above the ground. The other portions of the building are, upon an average, 30 feet above the level of the ground, some of which are in readiness for the roofs (now nearly ready for fixing), while others are being roofed in. A contract has been entered into for the finishings of the entire building, and those of the House of Lords, and the rooms provided for the business of that House are in hand.

Mr. Barry states, that some delay has taken place in the fixing of the iron-work of the roofs, owing to the unsettled state of the iron trade, and difficulties with workmen, and that the stone for the exterior of the building is still continuing to be supplied in great abundance, and of most excellent quality.

The iron roofs used are exceedingly light and elegant. They are covered for the most part with large slates from Valencia Island county of Kerry, where quarries of considerable extent have been opened recently, and afford employment to a large number of people.

Much iron is used throughout the building, and this material will probably be more employed elsewhere in consequence. The roof of the House of Lords is composed wholly of wrought and cast-iron galvanized. The joists and flooring of this House are also of iron, and are now in progress. We sincerely wish Mr Barry health to carry out his fine design.

THE THAMES AND ITS EMBANKMENTS;

WITH REMARKS ON THE MOTION AND ACTION OF RUNNING WATER.*

BY JOHN PHILLIPS.

The action of running streams upon their channels depends upon the declivities, and the nature of the soil; but the action of the augmented velocity at the parts to be embanked will ultimately produce an increased depth of the channel, as the scour will continue to act with greater mechanical effect, more particularly upon the bottom of the channel in the middle of the run of the stream, until the resistance offered by the hardness and tenacity of the soil, and also the diminished declivity, becomes somewhat equal to the velocity and the abrading action of the water. It is impossible that the resistance of any material, mathematically considered, can ever be equal to the power exercised by the abrasion of the water; but in order to produce and retain an uniform channel, and by these means a regimen to the stream, other causes, both natural and artificial, have generally an influence, and are brought in to aid this purpose. The momentum of the velocity of the *river-water*, assisted by the inclination of the bed, have considerable influence in checking and retarding, during the first quarter, the flow of the tide, as far as the action of the latter reaches; and the resistances offered by either are as the squares of their reciprocal velocities; so that whichever has the greatest momentum (the flowing tide against the reaction of the river-water, and *vice versâ*), the other must give way to it as a matter of course; but as soon as the action of the flood from the momentum of the sea overcomes the partial resistance of the river-water, the velocity and power of the former will begin to augment accordingly. In many parts of a tidal river these conflicting actions of the streams have considerable tendencies towards producing shoals and bars across the channel. Where the downward stream meets the flood, the ripple and regurgitation of the contending waters disturb the loose sand and gravel of the bed, which being suspended, are carried away with the set of the revolving waters, and thus become deposited as shoals and bars in the eddies. But shoals and bars cannot occur where the material of the bed is such as to offer a sufficient resistance to these actions, and when the stratum is perfectly hard and indurated; and as the tidal water and the pent-up river-water act as a scour during the ebb, the detritus, such as sand, gravel, silt, and mud, will be carried outwards to the sea, and the conflicting actions of the flood and ebb being stronger at the mouth of a river, have a greater tendency to throw up alluvial shoals and bars at that point. Now the velocity and mechanical power of a uniform stream of running water are increased by the augmentation of its depth; and the actual increments of the former vary as the square roots of the hydraulic mean depths, and of the sine of inclination conjointly, and of the latter as the quantity of water and the squares of the velocities. But in the case of tidal rivers, as, for instance, in the Thames, the increase of both the velocity and the power are only partial, as is plainly observable some time before and at the time of high-water. After overcoming the resistance of the river-water, the flow of the tide increases upwards for some time (probably about two-thirds of the time of its flow), from whence its velocity and power gradually diminish to the time of high-water.

There is a point of time too when the ebb tide has the greatest velocity, and this varies, in some degree, very probably, at every ebb. The ebb does not meet with retarding powers altogether similar to the flood. Immediately that the tide begins to recede, its velocity goes on increasing, and the mechanical action upon the channel also, until a certain time previous to low water, or when it loses that amount or body of water upon the channel, both in depth and power, which produces and constitutes the greatest velocity. In some degree, the precise time when the velocity is greatest will be dependent upon extraneous causes of retardation or acceleration. Thus the power of the wind acts, when ever it blows, either as an accelerating or retarding force, and, in consequence, may influence the precise or natural time of both the greatest velocities, and of low or high water. From observations, and by noting the fall of the tide, it appears that the greatest velocity is at about one-third of the ebb; and under ordinary circumstances the flood runs up five hours, and the ebb runs down seven hours. The gradations of the velocity and power of the ebb go on increasing from high-water up to a certain point, and then diminish to nothing down to low-water. Diagrams shewing the increments and decrements of both the rise and fall of the flood and ebb tides at every quarter of an hour, and also the velocities due to the heights of each at the same time, and during the time of full and new moon, and from new to full moon, would be of great value to all persons engaged on, or in any way connected with the river. From knowing the times of high or low water one would, by inspecting the diagram, be enabled to see how much either the flood or ebb had increased or diminished at any point and time of the tides, and also the velocities at those points and times. These could be taken at various points in the river between Putney and Blackwall, and would serve as valuable indices to the state of the tides between those points; but such experiments should be placed under proper scientific supervision, and verified accordingly.

The bed of the river between London and Battersea bridges has been considerably deepened by dredging, and by the increased volume and action of the tides since the removal of old London-bridge; so much so as to have exposed the bases of the piers of Blackfriars and Westminster bridges; and, in consequence, placed their stability in considerable danger. At the low-water of the spring-tides the footings of the north piers of Waterloo and Southwark bridges are exposed, the dredging and action of the tides having ploughed much deeper channels between them than when they were first built. Since the removal of the great obstruction to the river, old London-bridge, the motive power of the ingress and egress of the tides has considerably increased beyond the tenacity and consistency of the soil and the stability of the channel; and there is no doubt that the contemplated embankment would produce a much greater change in the depth of its bed, so much so as that many of the bridges would require increased protection. The present greatest velocities of the ebb of the Thames between Westminster and London bridges increase as the breadth decreases. From the former of these points the breadth gradually diminishes to the latter, and consequently the velocities increase inversely as the areas of the sections. The following table will shew the greatest velocities of the ebb between those points:—

From Westminster to Waterloo bridges the greatest velocity at the surface is	=	40 in. per sec.
From Waterloo to Blackfriars, do. do.	=	50 ,,
,, Blackfriars to Southwark, do, do.	=	65 ,,
,, Southwark to London, do. do.	=	70 ,,

These are the velocities at the surface of the river in the run of the tide, but the water at the bottom, from the unevenness of the channel and other retarding causes, does not move with the same velocity as that on the surface. The latter is found thus: from the square root of the velocity at the surface in the middle of the stream, expressed in inches per second, subtract 1·03; the square of the remainder will be the velocity at the bottom; therefore, according to this rule,—

From Westminster to Waterloo bridges the velocity at the bottom is	=	28·031 in. per sec.
From Waterloo to Blackfriar's, do. do.	=	35·295 ,,
,, Blackfriars to Southwark, do. do.	=	49·518 ,,
,, Southwark to London do. do.	=	53·825 ,,

It is of the utmost consequence attentively to consider and produce the stability and permanency of the channel. It is observable that by contracting the channel an augmentation of the velocity is imparted to the water, and this very materially increases the mechanical action of the stream; therefore it is essential, in order to obtain a stable and permanent channel, that the increased velocity and action correspond with the tenacity and consistency of the soil which form the bed of the river. According to the nature and ingredients of the soils which forms the bed of the stream, and the weight and size of the materials that lie upon the channel, from fine sand to large stones, a certain degree of proportional power is required to overcome the inertia of these bodies and to carry or drive them along. Therefore the substances will be acted upon by a momentum, more or less, according to the various velocities of the stream. An acquaintance with the velocity at the bottom of a running stream is most essential, in order to calculate what effect it may have upon the soil forming the bed of the river. In order to preserve an equilibrium between the action of the water and the tenacity and resistance of the channel, the nature and quality of the soil must be reciprocal to the momentum and abrasion of the water.

The motions of all running streams are excited and diminished in their rapidity by certain accelerating and retarding forces. The velocities which they begin to acquire in their descent would go on increasing as the square root of the perpendicular height of the declivity of the channel, and the depths of water due to their heads, were they not impeded by other retarding forces. That which makes all running streams uniform in their motions arises from the friction of the channels, and the tenacity, or the viscidity with which all the particles of the water are held together; and the velocities are owing to, and dependant upon, the declivities of their channels; the quantity of water discharged is also dependant upon the amount of the declivity; and, as was before observed, the quantity discharged is as the velocity; but the velocity is acquired from the inclination, for the surface of every fluid at rest is horizontal, and therefore cannot move until the surface is inclined to the horizon, when it immediately moves in obedience to the natural law of the force of gravity, as every particle of the stream endeavours to seek the lowest state of repose. Now the vertical section of a running stream varies as the inclination of the channel, for the declivity produces the velocity: thus, if a stream move along a channel with a mean velocity of 5 feet per second, and have a section 3 feet wide and 4 feet high, the discharge per second would be $3 \times 4 \times 5 = 60$ cubic feet; but if the same stream run further on in a similar channel, but with an increased declivity, which produces a mean velocity of 10 feet per second, the vertical section of the stream will be diminished to half the area of the former; for $3 \times 2 \times 10 = 60$ cubic feet as before. An increased velocity of a stream somewhat diminishes the pressure on the bed, and this also diminishes the friction and the resistance of the channel.

In order to preserve the channel of a river in a state of cleanliness, and to retain its uniformity, the scouring action of running water is the most efficacious mechanical agent; and this action becomes more powerful in preventing the deposition and accumulation of mud, and also of shoals of sand and gravel, when the quantity of running water is large, and moves with a high degree of velocity. A greater quantity of back-water is necessary in those rivers where the course is winding, for the purpose of keeping the channels free from deposits and accumulations, than in those whose courses are direct and straight; for in the former case a considerable quantity of the impetuosity and power of the moving current becomes destroyed by the reflected motions and eddies that are produced by striking against the sinuosities and projections of the banks, and from the centrifugal motions that are imparted to the stream in winding through the concave parts of the channel. Where the course of a river is of a serpentine form, it is observable that the mechanical action, from the greater velocity of the water along the concave portions of the banks, has deepened the channel much more at those parts than at the convex sides; and the abrading action of the currents upon the concavities is constantly wearing away those parts, the water carrying off the earthy particles of the soil, leaving the stony particles deposited upon the bed; because as the currents are reflected from the concavities on the one side into those on the other, the obliquity of the motions acts upon and wears away the bottom and banks, consequently, the convex banks are always less inclined to the channel, and much wider. But the declivity of the bed of a stream, whose channel is of a curvilineal form, is greater along a convex than along a concave bank, on account of the greater length of the curve at the latter part; for as the circumferences of curves increase

* Continued from page 124.

proportionally to their radii, the declivity is most where the length of curve is least. Now it would appear that the velocity of the stream must increase where the inclination is greatest, but the momentum of the flowing water reverses the action at those bends. A stream of water running from a straight channel into a curvilinear one, from the impetuosity of its motion, is carried onward and strikes the concave side, from which it is reflected to the opposite bank, at an angle approaching to the angle of incidence—for it cannot be equal to it, on account of the inelasticity and friction of the soil, and the viscidity of the particles of the water—from whence it is again reflected to the opposite bank, leaving the intermediate parts of the banks much less acted upon; and thus a series of convexities and concavities are formed along the channel. Therefore, a great portion of the momentum of the stream is expended along the concavities, from the progress of the water having somewhat of an angular motion, although not strictly so.

It has been deduced directly from observations and experiments, that a running stream of water moves with the greatest velocity at or near the upper surface in the middle of the stream, and that the velocity gradually diminishes from thence to the bottom and sides of the channel where it is the least; and the mechanical action of the water is always strongest where the depth and velocity are greatest; for in proportion as the depth and velocity decrease from the middle of the upper surface towards the bottom and sides, the mechanical action of the water upon the channel is also diminished in the same ratio. As the depth of the stream increases, the abrasion upon the channel must also increase in proportion to the pressure, but, although the abrasion increases with the pressure, it is somewhat proportionably less for larger pressures than for smaller ones. When pressure is removed and a body of water is allowed to flow, motion always takes place first in the middle of the stream, for according to the general law of gravitation, the mobility of the particles of the water when set in motion presses them against each other in endeavouring to obtain their lowest position; therefore, the filament in the middle is the first that seeks to escape, and the lateral filaments by losing their stability, slide or fall towards the centre of the channel; and when the stream is constant, they are continually endeavouring to supply the places of the middle ones. It is a well ascertained fact, that the channels of rivers and running brooks, assimilate very much to the concave curve of a circle transversely to the flow of the streams. When water collects into channels, it becomes a powerful mechanical agent in wearing away and carrying along the detrited soil, and both the widths and depths of all channels are dependent upon the nature of the substances of the ground and their degrees of induration, the banks sloping towards the channels at angles, which are peculiar to the nature of the soils; it is evident that the outline of the channel must be influenced by the peculiar quality and induracy of the soil, but it would appear that the *regime* of concavity is caused by the mechanical actions of the gradations of the velocity and pressure of the several filaments upon the channel, for the regular diminution of the velocities of the stream from the middle of the surface to the bottom and sides, and the proportional pressures of the water upon the base, produce a proportional diminution of abrading action upon the surface of the channel; thus, by the spontaneous operations of nature, the varying and proportional actions of the various velocities of the stream, and the proportional pressures of the water in contact with the bed, produce its curvilinear form.

In obedience to the natural law of the force of gravity when a stream of water is in motion down an inclined plane, every particle of the fluid endeavours to seek the lowest position to which it can attain, in order to find a state of repose. In pursuit of this object, every particle of the fluid from the farthest extremity of the stream at the sides towards the middle, in endeavouring to attain a central position, acts with a proportional increase of pressure against those next to it, and thus produces a maximum velocity in the middle of the stream. And in all cases the gravitating action of water by its exertion while descending to the lowest accessible level, and when collected into narrow circular channels, produces a power which becomes a most efficacious mechanical instrument in collecting and carrying along with it all the deposits and impediments it may come in contact with in its course, as well as the animal and vegetable refuse of towns. But in order to render the water available in lifting these excrementitious and other substances, and of sufficient power for promoting the necessary transmission of this refuse, a constant and copious supply is absolutely essential. As, in proportion to the quantity of water and the energetic impulse of the stream upon its channel, the removal of these substances is mainly dependent; and the mechanical power of the water, that raises these substances and carries them along in suspension, is more or less according to the depth and quantity, as well as the velocity with which it moves; and the augmentation of the latter is dependant in a great measure upon the declivity of the channel.

A considerable retardation of the velocity and power of a running stream, is produced by the resistance it receives from the friction of the surface of the channel, and the amount of friction is in proportion to the extension of the surface with which the water, while in motion, is in contact, as every point of the surface of the channel exerts a force directly opposed to the motion of the current. And it is this friction which imparts a resistance throughout the moving body, neutralizing the accelerating power of gravity and abrasion of the water, and making the stream to move with a uniform velocity along its various sections and declivities. It appears from the well-known law, of *extent of surface retarding the motion of water*, that if a stream of water be spread out, and allowed to run, in a rectangular channel, the amount of friction and consequent retardation will be much greater than if the same amount of water be confined to a circular channel, for the perimeter of the circle is less than that of any other figure of the same area, and conversely, the circle contains the greatest area of any polygonal or rectangular figure of the same perimeter, therefore, with a given sectional area of water, the amount of the abrading surface, or friction upon the bed, increases as the surface of contact increases, and will be determined by the form and perimeter of the channel through which it flows. Circular channels, therefore, are the most advantageous, where velocity and power of running water are required, as circles have less frictional and resisting surfaces under the same area; and it is for this reason that pipes are made circular for the quick conveyance and distribution of water, gas, smoke, sound, and many other contrivances in the arts. But the applicability and adaptation of these properties of the circle are the most essential in the formation of water channels, for the transmission of noxious animal and vegetable matter by the mechanical agency of suspension in running water, as for instance, house-drains, and public sewers. Now as a contracted circular channel meets the conditions of increased depth, velocity, and power of the stream, then unquestionably, according to the nature of the ground, a circular or elliptical form, with the longer axis upwards, is by far the best for offering the greatest resistance to external pressure with the same amount of materials, and for the quick transmission of any substances by the agency of running water; therefore, this form should in all cases be adopted for house drains, and public sewers; in fact, in a scientific point of view, that this is the best form, there cannot be the least doubt.

By observing the motions of running waters, it would appear that the particles do not move in straight and parallel lines, whatever may be the form and direction of the channel, for, in consequence of the resistance imparted to the current by the friction and asperities of the bed, the particles in contact and moving along the bottom are divided, diffused, and reflected in all directions, to distances that are proportional to the velocities of the stream; and the advancing and progressing force and momentum of gravitation of the waters turns and carries the reflected particles along in revolving and curvilinear motions: and it would appear that these conflicting motions by crossing, recrossing, and intermingling with one another, and with different velocities, retard the equal and uniform motion of the stream throughout its depth, and in consequence the velocity increases proportionally from the bottom to the upper surface, or, the velocity and action increases from the bed upwards as the resisting motions of the particles of the water reflected from the channel become expended and destroyed by the descending action of the force of gravity; for if the particles of water, from the momentum of the stream in moving along the channel, are reflected by the friction and asperities of the bed, may not each particle, however minute, be likened to any other projectile, and be subject to the same law of retardation and acceleration of gravity, and may not the diminution of velocity from the surface to the bottom and sides be thus accounted for?

In consequence of the winding courses of most tidal rivers, the channel which suits the current of the flux may be altogether different to that which suits the reflux, and the obliquity of the reflected streams of the former may not take place at the same points and fly off at the same angles as those of the latter; thus, an oscillatory and sideway motion of the soil on the bed will be produced, and the actions of the flood and ebb alternately cause shoals and ridges of sand and gravel to collect in the channel, and, in consequence of these obstructions, much of the power and velocity of the currents is checked and expended by breakers and eddies, and the water escapes and flows with an increased velocity between the channels formed by the shoals. In all tidal rivers the courses of the alternate currents, and those parts where their actions upon the channels are most strong, are peculiarly marked and observable when the ebb at spring tides is at the lowest. The winding course of rivers and rivulets lengthens and reduces the declivity of the channel, and the velocities are much less and the water higher in the elbows and bends; and where the currents move with the greatest rapidity the channels are most frequently the straightest. When a stream is constrained to move in the direction of a curve, its motion and course is constantly varying, because, from the centrifugal force of its motion, every concentric filament of the stream running round the curve evinces a tendency to fly off, or quit it at a tangent. The velocities of each concentric filament will be greater or less in proportion as their relative distances from the centre of the circle are greater or less, and the centrifugal force increases in proportion as the radius of curvature increases; therefore, the velocity of the stream augments as it recedes from the convex side. All angles and bends very much diminish the progression of the passing currents, and the retardation increases with the smallness of the curves and the abruptness of the angles.

The viscidity of the particles of the fluid and the friction of the channel conjointly, by their action, produce a uniformity in the motion of the water; and when all the obstructions, friction, and resistances of the channel, together, become equal to the force which accelerates the motion of the water, the stream will be uniform, having then no particular mechanical action on the bed, the velocity and abrading action of the stream and the sum of the resisting forces being mutual. When this takes place, and not till then, a permanency of the channel and a regimen of the river will be obtained. The disintegration of clayey and gravelly bottoms takes place by imperceptible degrees, the lesser particles of the soil being removed; then the larger ones, being left free and not held by other tenacious substances, the power of the water drives them along, and these in their progress lick away the soft and impalpable particles, and thus those bottoms not possessing resisting qualities become worn down by the superior mechanical action of the water. All soils have a certain stability consistent with the velocity of the water acting upon them; and by examining separately the effects produced by variations of the velocities of water upon soils, a knowledge of the actions of the running waters of rivers upon their beds is obtained. As different kinds of soil constitute the bottoms of rivers, a knowledge of the various velocities which act upon and carry along different-sized bodies, is of great importance in determining the nature of the soil for the bed, which shall maintain a certain breadth, depth, and velocity of a river. Now it has been ascertained from various experiments, that water flow-

ing along at the bottom of a stream with a velocity of

3	inches per second will work upon and carry away particles of			fine clay.
6	do.	do.	do.	fine sand.
8	do.	do.	do.	coarse sand.
12	do.	do.	do.	fine gravel.
24	do.	do.	do.	coarse gravel.
36	do.	do.	do.	gravel 1 in. diam.
60	do.	do.	do.	,, 2 in. ,,
72	do.	do.	do.	stones 5 in. ,,
84	do.	do.	do.	,, 7½ in. ,,

It would appear, therefore, from these experiments that in order to maintain the *present* breadth, depth, and velocity of the river between Westminster and Waterloo bridges, very coarse gravel is required for the bed; between Waterloo and Blackfriars bridges, gravel 1 inch diameter is required for the bed; between Blackfriars and Southwark bridges, gravel 1½ inch diameter is required for the bed; and between Southwark and London bridges, gravel-stones 2 inches diameter are required for the bed. This shews at once that the indurated mass of gravel and clay, of which the present bed of the river is composed, does not offer a resistance, in the greatest run of the tide, sufficient to counteract the momentum of the flowing and reflowing of the tides; and, in consequence, the reason of the deepening of the channel (assisted, indeed, by dredging), is strikingly manifested since the removal of the great dam or obstruction to the flowing and ebbing of the tides, namely old London-bridge.

London and its environs now contain a population of upwards of two millions of souls, and nearly all the impurities that are engendered within this great city and its suburbs are permitted to be discharged into the sewers by drains; almost every dwelling or other premises may now be drained, as sewers, which are of comparatively modern construction, are arranged and placed at such depths below the surface of the lower floors of buildings as are *considered* sufficient to afford perfect drainage from the various tenements. It must be obvious that the impurities, when discharged into the sewers, should not be allowed to deposit and accumulate within them, but should be carried off to the river as fast as engendered, and with the greatest possible speed. The same principle is also applicable to the discharge of the impurities, when received into the river. Nearly all the sulliage matter, as it is discharged by the Westminster, the City of London, the Tower Hamlets, and the Surrey sewers, into the river, becomes deposited upon its banks. Between Putney and London bridges the river is of a serpentine form, and its banks are of very unequal width. At low-water, vast quantities of mud and *living* corruption are exposed to view, at those situations upon its banks which are flat and wide. These accumulations are by far more frequent on the north shore of the river, and are the deposited matters brought down and discharged into the river by the various sewers. Numerous accumulations of it may be seen between Battersea and Blackfriars bridges, and the shore at low water in several places is of a reddish colour. When examined, the cause of this colour is found to arise from myriads upon myriads of small red living worms, embedded in the mud, and entwined together for several inches in depth. At one place between the Horseferry and the new Houses of Parliament, there is an extensive bank of mud, varing in depth up to 5 feet, and the surface of this bank is nothing else than a congeries of worms entwined together, and exceeding a foot in depth. When disturbed, the heaving of the mud is very perceptible, and the stench from them is noisome in the extreme.

In front of Whitehall-gardens, the accumulation of matter from the sewers is nearly 6 feet deep. Nearly the whole of the surface at this point is of a reddish colour, and is also covered with myriads of worms; and at low-water, carrion-crows may very frequently be seen feeding upon them. In warm weather streams of exhalations are evolved from these extended heaps of abomination; and the effluvia being mixed with the atmosphere, are wafted into the streets and dwellings, and, of course, are inhaled by passengers and by the neighbouring inhabitants. The residences of the Duke of Buccleuch, Marquis of Ailsa, Earl of Harrington, and Sir R. Peel, are situate in this locality; and these noblemen and gentlemen are thus living surrounded by a bog, and inhaling air of the most nauseous description.

GOTHIC TRACERY PRODUCED BY MACHINERY.

We mentioned last week that Mr. Billings had brought under the notice of the Institute of Architects, Pratt's patent carving machine. From the time of the revival of pointed architecture in England to the present day, architects, even when they had skill (too seldom alas!), have been trammelled in their efforts to produce works approaching in excellence to those of the middle ages, by the great cost at which alone it was to be effected. At this moment the principles of pointed architecture are better understood than they ever were, and but for the circumstance just mentioned we might hope to see structures raised equal in beauty to the wonderful productions of our forefathers. In designing an edifice in this style, however, the inquiry, now ever present to architects is, what can be done without —how much decoration can be omitted, and yet the characteristics of the style be retained? and so they are compelled to pare, and shear, and leave out, and necessarily fall very short of the early works, which were usually the result of a long period of time, and were effected without regard to the total cost. A variety of expedients in the shape of imitations have been resorted to, but are now very properly abandoned.

By the machine recently patented, and which we have examined with great satisfaction, the difficulty here alluded to will be considerably lessened, insomuch as by its means, the most elaborate tracery can be carved *out of the solid wood or stone* with great rapidity, and for about one-third of the sum it would cost if executed by hand. It is capable of working any form, however elaborate, even to the tracing of a map, and is yet so simple in its operations, that a few hours' practice will enable any mechanic to work it. It may be described as presenting a union of the lathe, drill, and pentegraph. A small cutting tool is made to revolve very rapidly by means of steam power, while, at the same time, it is enabled to pass over the lines of a pattern (formed of cast-iron) which is fastened down on to the wood or stone that is to be carved. A further motion is given by means of the table on which the material is placed; and it is in the production of these various motions that the invention chiefly consists. The tool is said to make 3,000 revolutions in a minute, and, as it presents eight cutting edges on its circumference, 24,000 cuts. The hardest oak, the softest pine, and the most brittle stone are equally operated upon; and the largest spandrel of a roof, or the smallest screen-work can be produced. The patterns being inexpensive, it is stated that every panel of a screen may be different without much increasing the cost. The machine was invented by a Mr. William Irving, and was used in the first instance simply for inlaying floors, &c. The credit of its application to carving and other architectural purposes belongs, we believe, to Mr. Pratt, who, discerning its capabilities, effected an arrangement with the inventor, and patented the machine. He has executed, amongst other works, a roof for Ravensworth Castle, and a screen for Great Malvern Church.

We cannot avoid regarding this invention as a most important occurrence for the interests of architecture, and anticipate from it the best results. It has not even the disadvantage which in the first instance usually attends machinery, that of superseding manual labour: on the contrary, it will probably increase the occasion for it, by introducing a description of work not hitherto within the architect's means; and, as the artist's hand is required for the bosses, crocketts, and other enrichments (which the machine merely blocks out), may call into operation a school of carvers.

Protection of Works of Art.—A bill for this purpose has been brought into the House of Commons by the Solicitor-General.

Royal Academy of Arts.—A notice has been issued to the effect, that all works of painting, sculpture, or architecture, intended for the ensuing exhibition in Trafalgar-square, must be sent in on Monday the 7th, or by six o'clock in the evening of Tuesday, the 8th of April next, after which time no work can possibly be received, nor can any works be received which have already been publicly exhibited.

BRICKS AND BRICKMAKING.

In one of the previous numbers of The Builder, the writer observed an extract from the *Mining Journal*, relative to the manufacture of bricks, in which it was stated that an admixture of chalk with the clay from which they are made is injurious to the quality and strength of the bricks; this to a certain extent is true, but not so much so as the author of that paragraph would lead us to infer. Some soils used in the manufacture of bricks are so loose and incohesive, that unless they are held together, as the workmen term it, by an intermixture of chalk, it would be scarcely possible to make them into bricks of any value, either for the market or for building. It must, however, be admitted, that if there is an over proportion of chalk thrown into the clay, more particularly if the chalk is not well mixed, the bricks so made must of necessity be bad both in appearance and quality.

And as it mostly happens that chalk is accessible to brickmakers, they do not fail to employ a very considerable quantity of it in their process of manufacture, which, being badly prepared and improperly used, unquestionably deteriorates the useful value of their bricks; so long, however, as they can contrive to keep them of good colour, they are satisfied even if they possess no other recommendatory quality; because they can always dispose of their stock to cutting builders, who care but little for the quality of the material they use in any kind of building, the speculative, of course, not excepted. Good clay is a great thing in brickmaking; but *time* and *labour* are as great, if indeed not greater, for indifferent clay with plenty of time and labour will make quite as good bricks as the best clay improperly used; if the labour in either case is stinted, the quality of the bricks will be injured one way or another.

If pure argillaceous earth is to be used, it should always be mixed with chalk and sand, care being of course taken not to put in too much of either; the sand should be as clean and free from impurities as possible, and the more silex it contains the better, as it will then harden the bricks when they are burnt; if, however, there should be too much silicious matter, they will either fuse and run together into clinkers, or else they will turn out too brittle and shaky to be of much service to the builder. If too much chalk is put in, the bricks will be rotten and porous, for it appears to have the effect of preventing the intimate union of the sand and clay when being burnt, but if properly applied, it improves the bricks both in quality and colour. To make good bricks, it is essential that the earth should be exposed freely for some time to the action of the atmosphere, after it has been first dug out of its native bed, and if it be subjected to the action of frost for some weeks before it is ground up, so much the better for the quality of the manufactured article; the more the clay is pulverized and beaten, the better will it be tempered, so that labour, as I before observed, is one of the very best materials in the whole range of brick-making, as it is with every thing else; but time and labour being of high price, the brick-makers of course avoid the use of them both as much as possible. Good silicious sand when mixed with the clay fuses when at a red heat, and incorporates itself intimately with the other particles of matter in the bricks, and, like most other fused ingredients, it solidifies on cooling into a hard, close-grained, compact body, capable of resisting the alternate changes of the atmosphere longer pehaps than any other material not of similar production: it is the silex that gives the brick the sharp sonorous ring when struck together, and if there is not too much of it, and it is not too highly scorched in the clamp or kiln, the brick will be more durable than most of the stones used for building purposes. If chalk is mixed with clay merely in a broken state, without being washed and ground, the bricks are sure to turn out more or less faulty; the best way of using chalk is to grind it in the large mill, and reduce it to a kind of hydrate, and then pour it over the clay, previously prepared to receive it; as soon as it has settled, the superfluous water should be run off, and after a little time, allowed for the remainder of the water partially to evaporate, it should be intimately mixed with the clay by digging, pounding, and raking, and the more thoroughly it is incorporated with the clay the better.

I have seen bricks so carelessly made with respect to the use of chalk, that on dropping one of them, it would break to pieces, and exhibit the chalk in large solid lumps; in such case, if the bricks should be saturated with water, after being passed through the clamp, they will heat, swell, and crack in all directions, in consequence of the chalk having been converted into caustic lime, by having its carbonic acid expelled when being fired in the clamp or kiln.

Bricks vary as much in colour as they do in quality, which is attributable to a number of causes, the two principal, however, are the natural quality of the component parts of the clay, and the mode in which the bricks are treated in the process of manufacture; some clay contains a very heavy trace of iron in different shapes, varying in colour from deep brown to light yellow, according to local circumstances; it is not unfrequently tinged of a greenish blue by the presence of the silicate of iron, which causes the clay to be mottled in its appearance in the pit. Great care is required in burning bricks to produce them of a good uniform pale yellow colour, which is the favourite of the London market, for if they are burnt too rapidly in contact with a free supply of atmospheric air, they are liable to be of a dingy red colour, alternating into a coarse dusky brown; whereas if they are carfully burned with but a moderate supply of air, say just enough to turn the iron into a peroxide, it will colour them of nearly a uniform sulphur yellow, which is the preferable colour according to present notions.

One great cause of the inferiority of bricks is the unwarrantable haste in which they are made; the field is now often bought, the earth prepared, and the bricks made ready for use in a few weeks; in fact, as many months are required to prepare the earth properly as we now take only weeks to make them complete. It is a very common matter now-a-days for a contractor to take a field near where his work lies, and make the bricks in the spring that are to be used in summer. The great falling off of the quality of modern bricks is a very probable cause of the decadence of the art of bricklaying, which has sunk from a high degree of perfection to its present miserable condition.

Where are we to look at this time for such brickwork as the builders of Wren's day produced? The highest ambition of a bricklayer is now to run a few arch-heads and window-crowns in "fine stuff," never daring to come into honourable rivalry with the glorious work—neat, clean, close, and smooth—of their worthy, plodding, but not to be beaten, great grandsires.

I will conclude these few words by repeating, that until our brick-makers give *more time and more labour* to the manufacture of their materials, it is hopeless to look either for good bricks or good brickwork.

JOSEPH LOCKWOOD.

EFFECT OF SEA-WATER ON CAST-IRON.

MR. FARADAY has addressed the following observations on this subject to Sir Byam Martin, chairman of the "Harbours of Refuge and Defence" commission:—

"Sir,—I hasten to reply to your note, though not, I fear, with any certain knowledge, for infirm health has prevented me from taking up the consideration of the action of sea-water on iron, as my observations will permit. I conclude that the question is of cast-iron in sea-water. Between these two bodies there is a vigorous action. As far as I have been able to observe, it is the greatest in the water near the surface; less in deep water, and least of all when the iron is buried in sand, or earth, or building materials (into which the water may penetrate); for then the oxide and other results formed are detained more or less, and form sometimes a cement to the surrounding matter, and always a partial protection. Soft cast-iron, as far as my experience goes (which is not much), corrodes more rapidly than hard cast; soft cast-iron, as far as my experience goes, more rapidly than the brittle white iron. As to the amount of corrosion in any given time, I have not had the opportunity of observing any good and satisfactory cases of illustration.

"In estuaries and the mouths of rivers it is very probable that great differences of corrosion will arise from the different circumstances of ariable saltness; the soil of the river if near a town, the metallice, will much effect it; thus a wharf of cast-iron might occasionally be greatly injured by making fast to it vessels that are coppered using iron cables.

"As to the protection of iron, and first by a coating; the permanency of a coat of paint, or of tar, or bituminous matter, can only be ascertained by reference to experience. Of this I have none, except in a case where coated iron sheathed for vessels was brought to me. I was much impressed with the thorough adhesion of the coat to the iron. The process was patent, and I cannot remember whose it was. Zinced iron would no doubt resist the action of the sea-water as long as the surface was covered with zinc, or even when partially crusted with that metal; but zinc dissolves rapidly in sea-water, and, after it is gone, the iron would follow.

"As to voltaic protection, it has often struck me that the cast-iron piles proposed for light-houses, or beacons, might be protected by zinc, in the manner Davy proposed to protect copper by iron; but there is no doubt the corrosion of the zinc would be very rapid. If found not too expensive the object would be to apply the zinc protectors in a place where they could be examined often, and replace them when rendered ineffective. In this manner, I have little doubt that iron could be protected in sea-water. It is even probable that, by investigation and trial, different sorts of iron might easily be distinguished and prepared, one of which would protect the other; thus soft cast-iron would, probably, protect hard cast-iron, and then it would be easy to place the protecting masses where they could be removed when required.

"Hence, though iron be a body very subject to the action of sea-water, it does not seem unlikely that it might be used with advantage in marine constructions intended to be permanent, especially if the joint effects of preserving coats of voltaic protectors were applied. Perhaps engineers are in the possession of practical and experimental data sufficient to allow the formation of a safe judgment on this point. For my own part, I am not, and therefore am constrained to express the above opinions with much doubt and reserve."

ON FIXING CLOSE STOVES.

SIR,—In consequence of the numerous fires that constantly occur from the *careless* manner in which close stoves are generally fixed, I beg to offer the following remarks for insertion in your popular journal, with the hope that they may lead to some improvement.

Nearly all stoves of this kind, if not properly attended to, are dangerous from getting overheated, and consequently should be securely fixed away from any combustible material. If the stoves are placed detached in the open space of a room or workshop, the wood floors should be cut away, and trimmed to at least 12 inches in length all around the stove; an arch of brickwork should be turned under in cement and a piece of stone laid to a level with the floor, which, to the extent of 18 inches further, should be lined with lead, and the stove placed in an iron pan. If the horizontal pipe is carried into the chimney opening, the latter should be filled up with brickwork (or sheet-iron) with a trap-door, so that the soot may be removed, which frequently falls down; several fires have arisen from this cause alone. If the pipe is used for heating glue-pots, drying timber and other materials, the whole of the stove and pipe should be embraced by an iron fender, about 3 or 4 inches higher than both of them, or at least a trough of iron running the whole length of the pipe, leaving a space of 7 or 8 inches round the same. And they might in manufactories, workshops, &c., where appearance is not much considered, be placed on three or four courses of brickwork covered with a piece of stone, having an iron rim to form a fender round its edges; another method might be adopted, and perhaps the more convenient, leaving the chimney open, and having an elbow to the end of the horizontal pipe with a length of perpendicular pipe up the flue, which should be filled up just above the level of the mantel with brickwork or slate, having a trap, so that the chimney might be easily swept. With this arrangement, the stove might at any time be removed and a register grate be placed in the recess. When a stove is close to a chimney opening within the confines of the stone hearth, either of the above plans with regard to filling in the chimney opening may be employed, having a liberal quantity of sheet-lead spread on the floor round the same. Many flues are fixed with the horizontal pipes running through wood partitions, having holes cut just the size of the pipe; the pipe from want of cleaning, gets red-hot, and sets fire to the woodwork. It would be better in all such cases to take out the wood panel, and insert an iron one, which would prevent such accidents, and when painted to match, would make the whole complete in appearance. In no case should stoves or pipes be placed within less than 12 inches from any woodwork, unless it be lined with lead; and in confined places, running through cupboards, &c., there should be double pipes, leaving a space for a draft of air to pass freely between them. Lead is the best material to be employed, the cheapest, and most durable, and being pliable, may be easily dressed round mouldings and other projections, and when well nailed on the floors, is less likely than iron to be turned up by the traffic of the feet. It is of the utmost importance that all stoves should be safely fixed, not only for the security of the party setting them up, but that of his neighbours; a few pounds laid out in the first instance would produce a saving in the end, seeing how many fires arise from them, and that the insurance offices charge from 1*s.* to 5*s.* additional premium, according to the number and nature of the stoves. No extra charge is made when they are properly fixed and attended to.

I do not offer these suggestions as new, but as likely to prevent accidents by fire, and the infliction of high premiums by the insurance offices. W. J. S.

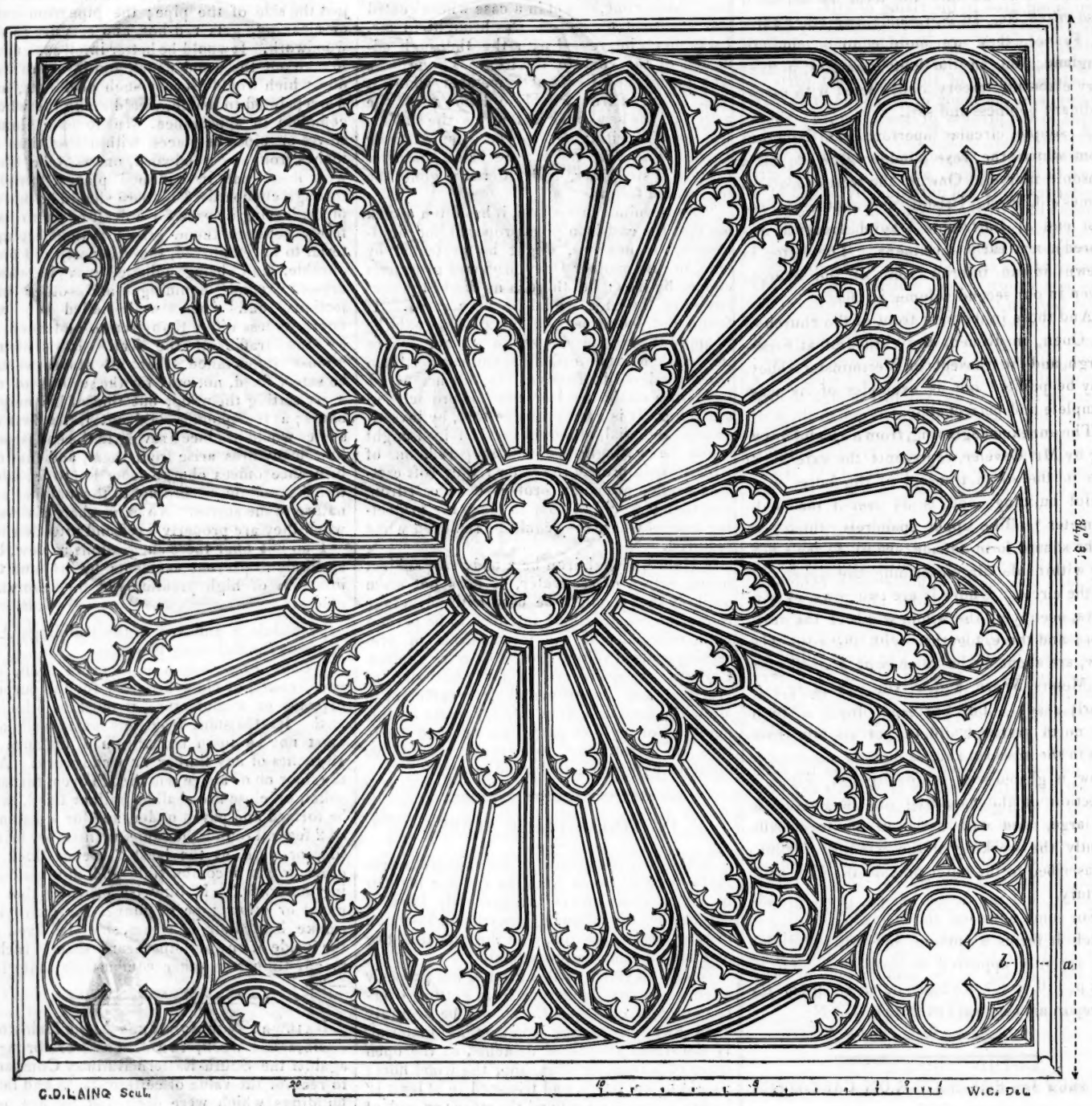
[Schedule F annexed to the Buildings Act, contains the following clause:—

"*Close Fires.*—And as to every oven, furnace, cokel, or close fire used for the purpose of trade or manufacture, it must be 6 inches at the least distant from any party-wall, and must not be upon nor within a distance of 18 inches of any timber or wood-work. And the floor on or above which such oven, furnace, cokel, or close fire shall be built or fixed, must be formed and paved under, and for a distance of 2 feet all round the same, with stone, brick, tile, or slate, at the least 2 inches thick, or other proper incombustible and non-conducting materials." It likewise provides that no metal or other pipe or funnel for conveying smoke, heated air, or steam, shall be fixed on the inside of any building nearer than 14 inches to any timber or other combustible material. —ED.]

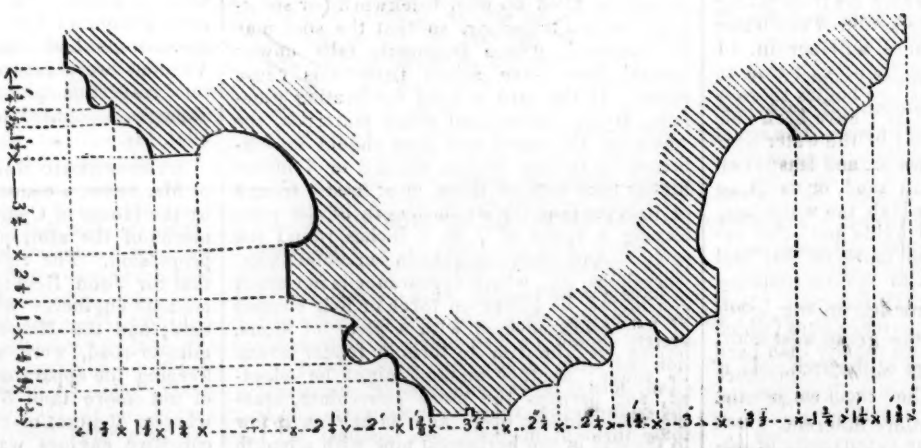
RAILWAY NEGLIGENCE.—At the Maidstone Assizes last week, two actions were brought against the South-Eastern Railway Company, to recover the value of certain stacks and farm buildings which were destroyed by fire, originating in sparks emitted from the chimney of a railway engine. Proof was adduced that means had been taken upon other lines of railway, by placing a wire guard over the top of the chimney of the engine, or by using a plate perforated with holes in front of the smoke-box, to prevent the burning coals or ashes issuing from it; but that upon this line these precautions had been altogether neglected. Verdicts were returned in both actions for the respective plaintiffs; in the first, the damages amounted to 800*l.*, in the other to 894*l.* 14*s.*

ATMOSPHERIC RAILWAY.—On the motion of Mr. Shaw, a committee has been appointed by the House of Commons, to inquire into the merits of the atmospheric system of railway propulsion. The right hon. member stated, that Sir John Rennie, Mr. Cubitt, and other eminent engineers were confident of its success; and the Messrs. Maudslay, of Westminster-road, were willing to contract for keeping the apparatus in repair at an expense of not more than 5 per cent. per annum, whereas the cost of repairing the ordinary locomotive engines was 50 per cent. per annum; and the first expense of the atmospheric railway was not greater per mile than that under the present system. Sir Robert Peel consented to the appointment of the committee.

ROSE-WINDOW IN SOUTH TRANSEPT OF WESTMINSTER ABBEY.



(Exterior View.)



SECTION OF MOULDING AT LARGE, ON LINE *a—b*.

ROSE, OR CATHERINE-WHEEL WINDOWS.

Circular windows are found in the buildings of the 12th, 13th, and 14th centuries in England, France, and Germany. As well as rose, or catherine-wheel windows, they are sometimes called marigold windows; and in French works we have the term *œil des ailes*, *rosa vitrea*, &c. In Normandy, and other parts of France, they are more common than in England; and, in the later examples, present very elaborate tracery, constructed with extraordinary boldness and skill.

A simple circular aperture was the germ from which the rose window grew to be a masonic marvel. One in the west end of St. James's Church, Bristol, and another in the east end of Barfreston Church (recently restored), are early specimens. The latter is shewn in an interior view of the church, given in our second volume, p. 265.

And those in the west front of the church of St. Ouen, in Rouen, the cathedral at Strasburgh, and the transepts of Westminster Abbey, may be pointed out as examples of its most complete and perfect state.

The annexed engraving, from a careful drawing by Mr. Caveler, represents the exterior of one in the south transept of the latter wonderful building, and is 34 feet 3 inches in diameter.* The upper spandrels, which give it the square form outside, are solid; the vaulting withinside circumscribing the upper half of the circle. Under it are two rows of windows, occupying the whole width of the transept; and these, together with the rose window, are about to be filled with stained glass by Messrs. Ward and Nixon, which is now nearly ready. The corresponding window in the north transept differs but slightly from this in the tracery, and, as most of our readers know, is glazed with stained glass. Fig. 2 is a section of the moulding on the line, *a—b*, at large, and will serve to illustrate sufficiently the working of the window. It may be ascribed to the latter part of the fourteenth century.

For some notes on the beautiful building of which it forms a portion, in addition to what has recently appeared in our journal (p. 98 and p. 110, *ante*), we refer to an article on the abbey in another part of the present No.

GOTHIC ORNAMENTS FROM THE CATHEDRAL CHURCH OF YORK.

In continuation of our series, we present two other examples from this beautiful building.

Fig. 7 shews one of two compartments in the spandrels formed by the arch of the door at the west end of the north aisle, and the cill of the window above it. The door in the opposite aisle has two similarly shaped compartments in the same position, but the sculpture is different in each of them. The panel shewn, represents (at the same time) two passages in the life of Samson. It is about 2 feet square, and is in high relief. The other three are much defaced: they represent various conflicts.

Fig. 8 represents a crocket on the lower part of the pediment of the great west door, with part of the mouldings of the arch. It is 1 foot 8 inches long. The crockets on the upper part of the pediment are different.

* In Rouen Cathedral there are three, 50 feet in diameter. There is a fine example in the west front of Rheims Cathedral. Amongst the earlier specimens in Normandy are those in the *Abbaye aux Hommes*, Caen, and the Ducal palace in the same town.

GOTHIC ORNAMENTS FROM THE CATHEDRAL CHURCH OF YORK.

Fig. 7.

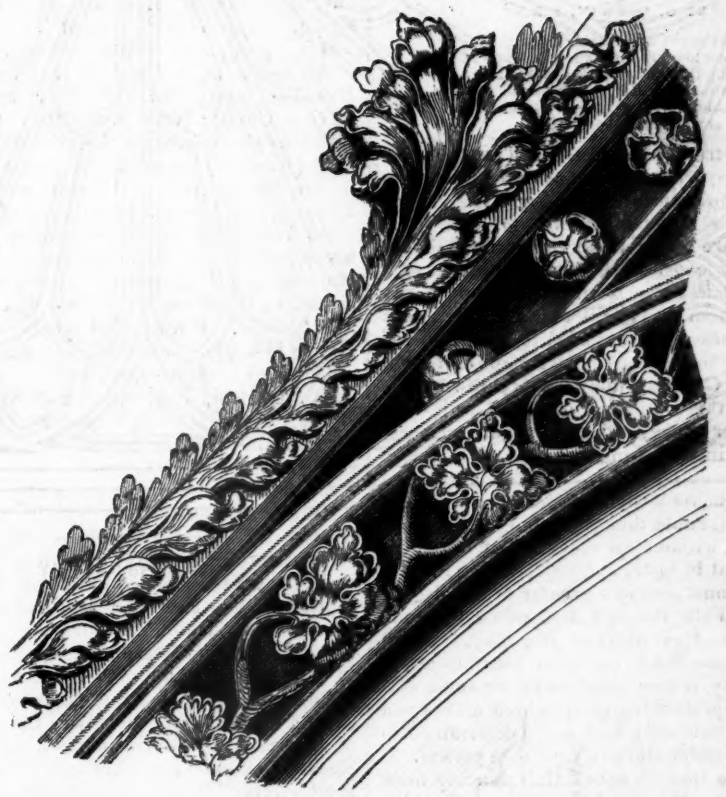


Fig. 8.

SOCIETY OF ANTIQUARIES.

A movement has taken place in this ancient and valuable society which is likely, we think, to have a good result. In a discussion caused by a proposal, that in future no meeting of the society should be suspended in commemoration of the death of King Charles 1. (Jan. 30th), it was admitted by members of the council that they scarcely ever met, and that, through neglect, the business of the society had accumulated, and was now in a complicated state. The arrears of subscriptions amounted to more than 2,000*l.* The following suggestions for the future conduct of the society, amongst others, were then made, and, together with the original proposition, were referred to the council, to be reported on at the anniversary:—

1. That the president of the Society of Antiquaries of London be requested to attend at the next anniversary of the society, and to deliver an address to the members, which may comprehend the names of the members deceased during the past year; the number of new members; the state of the finances; the state of the arrears due to the society; the advance made by antiquarian research and science in Great Britain during the past year, and such information as may be available respecting the progress of science in other

parts of the world; together with such observations as he may be pleased to combine with them,—such addresses being delivered by the presidents of the Royal Society, the Geographical, the Geological, the Astronomical, and the presidents of other enlightened modern societies of London.

2. That the auditors, in their next annual report, be requested to explain the charge of 447*l.* 10s. allowed as salary to the officers of the establishment; and to specify the sum paid to each of them,—a practice observed by auditors in other societies.

3. That the librarian be allowed hereafter a competent salary in lieu of fees; and the payment to the librarian of 2s. 6d. by each member on receiving each volume of the Transactions be abolished.

4. That a general opinion having been expressed that the office of president should not always be filled by the same individual, however accomplished and erudite he may be; that no person be allowed to hold the office of president in future beyond the term of four years.

5. That if the authors or contributors of papers deemed worthy of being read be fellows of the society, they be requested themselves to read them (unless such authors or contributors prefer that these papers be read by the secretary); and that immediately after the reading of each paper, the members of the society be invited by the chairman to make observations upon the contents of each paper.

6. That the council do meet for the despatch of the business of the society at the usual place, at three o'clock, on the first Wednesday of every calendar month, except in September and October; and that this meeting be not adjourned unless by the votes of a majority of two-thirds of the members present.

A CHAT ABOUT WESTMINSTER ABBEY AND GREAT MEN'S MONUMENTS.

BY G. GODWIN, F.R.S*

"They dreamt not of a perishable home
Who thus could build. Be mine, in hours of fear,
Or grovelling thought, to seek a refuge here;
Or through the aisles of Westminster to roam,
Where bubbles burst, and folly's dancing foam
Melts, if it cross the threshold—"

Our metropolitan minster (*west* of St. Paul's) is perhaps without exception, the most beautiful and instructive sight in London; and yet how many inhabitants of this great city there are who but for the accidental visit of a country cousin, which led them to seek the Lions, had never seen it? and how many more to whom it is still unknown ground? They have travelled, perhaps, to York, to see the Minster there; they have sought objects of interest at Cologne; they have thrown their eyes round the Cathedral of Strasburgh—but Westminster Abbey, close at home, has escaped their investigating gaze. Let them lose no time in seeking it out. We feel persuaded that few can visit this wonderful museum of skill, genius, noble thoughts, and memories of good deeds, without an elevation of mind, an improvement in taste, and a chastening in feeling which must tend in a greater or less degree to good. Walk through it, examine it, study it, as often and carefully as you may, you will ever find some fresh claim on your attention, some beauty before overlooked, or some evidence of unpretending piety, which makes you prouder of humanity and more determined to do nothing derogatory in your own person. It is, indeed, a spot "where folly's dancing foam melts if it cross the threshold;" where thoughts that are unholy die; where the past great ones of six centuries speak powerfully to you—it is to be hoped, not uselessly.

"Thinke how many royall bones,
Sleep within these heap of stones.
Here they lie, had realmes and lands,
Who now want strength to lift their hands.
Where, from their pulpits seal'd with dust,
They preach, "In greatnesse is no trust!"
Here's an acre, sown indeed
With the richest royall'st seed
That the earth did e'er suck in,
Since the first man dy'd for sin."

The multitude of monuments which it contains, from that of King Henry III. upwards (omitting, for the present, any remarks on the destructive effect produced by those erected in modern times), render it an index to English history, and a commentary; while the specimens of the workmanship of different epochs in wood and stone, and glass and metal, which these and other portions of the building present, make it a lecturer on British art, and a record of its progress. Edward the Confessor's chapel, at the east end of the choir, is alone a sufficient reward for a pilgrimage of a hundred miles. Here, where old Time seems to have secluded himself from the garish present, and reigns over remnants of the past, are ranged memorials of our early sovereigns—the pious Edward, Queen Eleanor, Edward I., Henry III., Queen Philippa, Richard II. and his Queen, and the gallant Henry V. It has nothing in common with the present time: it stands alone, and cannot be realized in the mind of any one of the thronging thousands, who are passing at so short a distance from the spot, if they have not visited it. Examine the pavement, examine the shrines—the chantry of Henry V., the screen next the choir, covered with minutest sculpturing—and see how the powers of art *have* been lavished in honour of God. Our forefathers were not satisfied with the decoration of the mere face of the part in human sight—the highest exercise of their powers was deemed hardly worthy of the temple; and so long as any portion, however remote or hidden, remained capable of improvement, so long was it deemed incomplete and requiring alteration.

Strange changes have occurred since a sacred edifice first occupied this site! What if it be *not* true that the Romans had a temple to Apollo here, or that Peter the Apostle raised the first chapel in the "Thorney Island," as the place was once called? There is good reason to believe that old Sebert, king of the East Saxons did, quite at the commencement of the 7th century: and this will give us a good 1200 years to talk about.

It was at first but a small building: Edward the Confessor perhaps made it larger. "Without the walls of London," says an ancient scribe, "uppon the river of Thames, there was in times passed a little monasterie, builded to the honor of God and St. Peter with a few Benedict monks in it, under an Abbote, serving Christ: very poore they were, and little was given them for their reliefe. Here the king (Edward) intended (for that it was neare to the famous cittie of London, and the river Thames, that brought in all kind of merchandizes from all partes of the worlde) to make his sepulchre:" and so commanded that the tenth of all his possessions should be applied to its re-construction. This was probably about 1050. Hardly 200 years afterwards Henry III. went to work upon it, and erected much of what we now see, and at his own cost be it remarked, if the chroniclers speak truly. By the eighth Henry the monastery was suppressed, and Thorney Island became a city, the abbey church, its cathedral.

Of the elegance of the Abbey as a structure it is almost needless to speak: it may be termed the finest example of the pointed style of architecture ever executed in England, and remains the most complete, with the exception of the cathedral at Salisbury. The combinations which its various parts form, especially at the eastern end, are as numerous as they are striking, and serve to impress a strong conviction on the mind, of the skill of the old builders, and the power they possessed of so arranging their structures as to excite pleasurable and lofty emotions. Amongst the most stiking of these combinations is that presented when standing beneath the porch of Henry VII.'s chapel, the gloom in which, most artistically devised, serves to render the full flood of light, to be found in the chapel itself, striking and effective in the highest degree. Burke remarks, in his essay on the sublime, "I think that all edifices, calculated to produce an idea of the sublime, ought rather to be dark and gloomy; and this for two reasons; the first is, that darkness itself, on other occasions, is known by experience to have a greater effect on the passions than light. The second is, that to make an object very stiking, we should make it as different as possible from the objects with which we have been immediately conversant; when, therefore, you enter a building, you cannot pass into a greater light than you had in the open air: to go into one some few degrees less luminous, can make only a trifling change; but to make the transition thoroughly striking, you ought to pass from the greatest light to as much darkness as is consistent with the uses of architecture." This the architects of the middle ages well understood; they appreciated the "dim religious light," and accordingly built their ecclesiastical edifices, for the most part, with comparatively few openings. When, however, as in the case before us, the style adopted rendered larger windows necessary, they reversed the arrangement, and so still obtained the required effect.

Many of the striking combinations to which we have referred are now sadly interfered with by the modern monuments, with which the Abbey is lumbered up—monuments for the most part so absurd that they would make us laugh if they did not make us sad. Mouldings, pillars, and adornments of all descripions have been ruthlessly cut away for them; openings have been interfered with, and even several of the spaces between the large clustered columns in the side aisles and chapels are blocked up to the top with tasteless and incongruous masses of stone and marble, alike unsuitable and discordant in colour and design.

The sculpture of the best periods of the middle ages has an entirely distinct and original character, prompted by the spirit of the time and carried out by genius. It is in no way imitated from the master-pieces of Pagan art, which might have been used as models; but is nevertheless full of feeling, and appeals to the sympathies rather than to the eye. In the ancient tombs at Westminster, as elsewhere, the sculpture is seen to be a portion of the building, conceived in the same spirit, and displaying the same feeling of reverence. All the figures are in repose, all are devotional—there is no flutter, no action even, certainly no worldly action; they do not seek to record, in vain self-glory, any moment of the past, but carry us forward to the great hereafter, and inculcate humility. Alas! how sadly this contrasts with those of more recent date, where every man "for his own hand," has worked in his own way, careless of the general effect, and has not worked well. Mountains of most *material* clouds, urns, flames, figures in ill-conceived and violent momentary action, accurate models of periwigs and whiskers, the evanescent fashions of a period of universal bad taste, form the staple—but why endeavour to prove what nearly all seem to acknowledge?*

As the writer has elsewhere remarked, in reference to the tasteless tombs and monuments with which all our cathedrals and churches have been gradually encumbered and overladen:—"Like some frightful fungus, they have spread insidiously over all parts of these structures, destroying alike their propriety, beauty, and stability." No more lamentable example of this evil is to be found than in Westminster Abbey; and it is to be hoped that efforts will be made, not simply to prevent the increase of this abomination, but, as opportunities occur from time to time, to remove the excrescences now deforming this fine pile, and so restore its harmonious proportions and original integrity. The triforium might be made to contain many of the monuments, as has been done at the Temple Church. Perhaps, too, the Chapter House, which is about to be cleared of its present contents (dirty shelves and presses), could receive some without injury to itself, so as gradually to restore to our venerable Abbey its former appearance.†

In spite, however, of the contemptible charater of the records, who can look around the south transept,—the poet's corner,—without emotion? Dryden, Cowley, Chaucer, Ben Jonson, Spenser, Butler, Gay, Thompson, Goldsmith, Gray, Dr. Johnson, Shakspeare, and a score of other heroes (heart-teachers, peaceful conquerors) marshal themselves before us, although not all buried here, and people the quiet aisles.

Nothing tends more strongly to elevate and refine the mind, to incite to virtue, or to deter from vice, than the contemplation of the burial-place of one who has rendered himself in either of these particulars an object of regard. The

* From "Facts and Fancies."

* One of Churchill's earliest effusions (before 1750) was prompted by these incongruous monuments. It commences—

"In famed cathedral who'd expect
Pallas, a heathen goddess,
To lift her shield, come to protect
Lord Stanhope?—this most odd is."

See Mr. W. Tooke's admirable edition of his poems, 1841.

† This suggestion was originally published by the writer in April 1843. It has been since urged by others.

power of association is great: and the merest memento of a wise, enterprising, or virtuous man,—of one who has advanced the cause of civilization, or desolated countries to gratify a restless ambition,—is often sufficient to induce long trains of wholesome thought. When, however, we see his burial-place, his last and narrow home, the man himself passes before the mind's eye; and the impression made, the lesson inculcated, is much more powerful. If a conqueror, we see him bereft of his pomp and power, to obtain which the blood of his dependants had been lavishly shed, and comprehend more fully than before, the folly of risking enduring happiness for that which hardly *is* before it is not; while, at the same time, the mind is rendered more contented with its sphere; reminded, that whether powerful or weak, rich or poor, all will find the same earthly goal,—the grave; and that the time which intervenes is so short, as hardly to be worth consideration:—

> "A little rule, a little sway,
> A sunbeam in a winter day,
> Is all the proud and mighty have
> Between the cradle and the grave."

Do we contemplate the remains of a good man? All his noble sacrifices, all the fine results of his exertions; the family saved from ruin, the generation advanced in knowledge,—pass vividly before our eyes. The heart involuntarily acknowledges the example, and good seed is sown. If these reflections be correct, it is important to a state that the mouldering remains of all men who have distinguished themselves above their fellows should be preserved and pointed out; and when party-feeling or prejudices lead to their disregard in one generation, it should be the business of the next to repair the omission.

If this were done, we should have statues, obelisks, busts, and temples at the corner of every street, in the centre of every square, and on the parapets of all the bridges. Rivals to Phidias and Praxitiles might arise amongst us; love of the beautiful and the good would be encouraged in the masses, and great changes in society would be effected. The time for it is approaching.

This, however, is rambling beyond the Abbey walls. The present state of the ancient monuments there is deplorable. Those who are in authority say they consider these monuments very sacred things, not to be touched without great care and consideration, as more harm than good might be done in attempting to improve their appearance. This is quite true, but there is nevertheless a limit to that forbearance, and this limit has been reached; if steps are not taken in several cases forthwith, nothing will be left to guide the restorer. We should be right glad to see a perfect restoration of the Abbey commenced, including the completion of the centre tower or spire, and the removal of the ugly western towers put up by Wren, who knew little of Gothic architecture, and liked it less. Relative to the erection of these towers, he wrote to the Bishop of Rochester:—"I shall speedily prepare perfect draughts and models, such as I conceive proper to agree with the original scheme of the architect, without any *modern mixtures to shew my own inventions*." Unfortunately, to do is not so easy as to know what ought to be done.

Amongst the earliest improvements to be made in the Abbey is the introduction of stained glass in the rose-window, and twelve lower openings of the south transept. The impulse which has been given lately to glass-painting in England is a pleasant sign, and cannot be too strongly aided. So firm was the belief that English artists in this department were inferior to foreigners, that the Chapter, it is said, had nearly determined on sending to Germany for the work in question; luckily, however, one or two members of it were staunch friends to English art, and succeeded in appointing an English artist; the result of which, it is to be hoped, will fully justify them for so doing.

We have not yet looked into the chapel of Henry VII., *orbis miraculum*, as Leland calls it—one of the most beautiful specimens of the last period of Gothic architecture which England or any other country can boast.* From its roof, "pendent by subtle magic," to the floor, the whole presents a rich lace-work of decoration. Of the roof, indeed, description can give no adequate notion. It is literally—

> "Self-poised, and scooped into ten thousand cells,
> Where light and shade repose, where music dwells
> Lingering—and wandering on, as loth to die,
> Like thoughts, whose very sweetness yieldeth proof,
> That they were born for immortality."

The lover of architecture after studying the perfect development of the pointed style in the minster itself,† with its acutely-pointed arches, its lofty attenuated columns, its infinite divisions, finds here the style which succeeded it when the arch was becoming more horizontal, and when a love of decoration threatened, as indeed did soon afterwards happen, to overwhelm good taste, and lead to the abandonment, for a time, of pointed architecture altogether.

As relates to sculpture, Henry VII.'s chapel presents one of the finest illustrations of early art in England, in the series of figures which fill the countless recesses in the walls. It is said they were once three thousand in number, but this is perhaps doubtful. They display admirable feeling for art, and deserve attentive examination. The carving, too, in the stalls here, is good, and leads us to express regret that so little encouragement is now given to this branch of art in England.

There are a considerable number of artists employed in it at this time, but unfortunately—such is the dominion of fashion (another word for caprice)—it is chiefly, if not wholly, in the imitation of old work, to be afterwards stained and sold as such. The upholsterer is the *arbiter elegantiarum*, and the result is exactly what might be expected under such circumstances. The remedy for this, and many like evils, is to make artistical knowledge more general, and to induce the multitude to talk and think on the subject. With an increased public—an extended circle of admirers and employers—the powers of the artist will be more fully called into play; and the more critical that public is, the more strenuous will the efforts of the artist be to maintain himself superior to his judges.

* Commenced A.D. 1503.

† Commenced A.D. 1220.

INSTITUTION OF CIVIL ENGINEERS.

MARCH 11th, 1845.—Sir John Rennie, president, in the chair.

The discussion was renewed upon the relative merits of the screw and paddle-wheels as methods of propulsion, and was extended to so late a period, that no papers could be read.

It was stated that the Napoléon screw-steamer, in the French post-office service, made on an average, quicker voyages than any of the paddle-wheel steamers of the same power on the station; that in smooth water the latter vessels would make some way, but in rough weather the former was decidedly superior. The same result had been noticed with the Archimedes. When steaming down the river, she was frequently passed by merchant steamers, but by the time she had arrived at Dungeness, if there was any sea up, she had regained her place, and was a-head of the paddle-wheel steamers.

It was thought, however, that with the feathering paddles, invented by M. Cave, and equal power, the Napoléon would have done quite as good work as with the screw.

The peculiarities of the steaming qualities of the Rattler, in spite of her bad build, were fully described. It appeared that in heavy weather, when sailing and steaming, and when it was thought that she was dragging the screw through the water, the dynamometer shewed a very effective exertion of power, and that the slip was extremely small: that when the royal yacht was obliged to shorten sail, because of losing speed by the heeling over of the paddles, the Rattler was enabled to use all her canvas and engine power together, and to gain way in the same proportion as the other vessels lost it. The general impression appeared to be that the experiments were very satisfactory, and if the Rattler had been a well-formed ship, and the power on board had been greater, the results would have been much better.

A good adaptation of the screw was mentioned in the two schooners the Margaret and Senator, built by Messrs. Pim, at Hull, and trading between that port and London. They were fine schooners of 242 tons burthen, fully rigged, but having near the stern two engines, each of fourteen-horse power, connected by wheel-work with a screw propeller. The result of a trial between the Senator and the Shannon, the latter being a regular paddle-wheel steamer of good power, was, that in the voyage between Dublin and London, the Senator arrived in London only ten hours after the Shannon, having consumed only eighteen tons of coal, while the Shannon had used ninety tons; proving that for mercantile purposes, where extreme speed was not essential, but that punctuality was desirable, the screw-propeller, adapted to sailing vessels, was calculated to be of essential service.

A curious letter was read from Lady Bentham, proving, by extracts from documents, that half a century ago, the late Sir Samuel Bentham, to whom was intrusted the building of several men-of-war, was the originator of the introduction of *water-tight bulk-heads*, dividing vessels into compartments, for preventing accidents from leaks, and also for stiffening them. Sir Samuel was aware of the plan having been used by the ancients, and also that the Chinese use the plan now. He also invented the wrought-iron water-tanks, and the metal casks for storing the powder, both being fitted to the shape of the ship. The letter containing these interesting facts, was remarkable for the clearness of its expression and for the accuracy of demonstration, when it was considered that it proceeded from a lady in her seventy-fifth year.

Correspondence.

TO GIVE PLASTER OF PARIS FIGURES THE APPEARANCE OF MARBLE.

SIR,—I am always pleased to communicate to others any item of useful information which I may have gained either in the way of my business, or otherwise; and I often think that THE BUILDER might be made extensively useful, if parties would make a more frequent use of its pages for that purpose.

In answer to the request of "C. T. L." in THE BUILDER of last week, I hope he will find the following methods satisfactory for the purpose of making plaster of Paris casts look like marble. I am, Sir, &c.,

CHARLES NEWNHAM.

Put into four lbs. of clear water one oz. of pure curd soap, grated and dissolved in a well-glazed earthen vessel; then add one oz. of white bees'-wax cut into thin slices; as soon as the whole is incorporated, it is fit for use. Having well dried the figure before the fire, suspend it by a twine, and dip it once in the varnish; upon taking it out, the moisture will appear to have been absorbed; in about two minutes' time stir the compost, and dip it again, and this generally suffices. Cover it carefully from the dust for a week, then with a fine soft muslin rag, or cotton-wool, rub the figure gently, and a brilliant gloss will be produced.

Or,

Take skimmed-milk, and with a camel's-hair pencil lay over the model until it holds out, or will imbibe no more. Shake off, or blow off, any that remains on the surface, and lay it in a place perfectly free from dust. When dry, it will look like polished marble, and this mode answers equally well with the former, except it be exposed to the wet weather.

N.B. The milk must be well skimmed, or it will not answer the purpose.

COMPETITIONS.—LUNATIC ASYLUM FOR THE COUNTY OF SOMERSET.

SIR,—As you have expressed your desire to assist the efforts of architects in obtaining a better system of competition than at present exists, I beg leave to contribute my mite of experience on the subject.

I am much surprised that the profession can submit to be tricked with false pretences of rewarding the most meritorious (when it is well known that in four cases out of five favouritism has been shewn), without making some effort to bring their taskmasters to account, and thereby prevent them from attempting to make fools of them, and availing themselves of their gratuitous labours.

I believe it is generally admitted that architects as a body are particularly selfish, and

possess the spirit of rivalry even to weakness. I have known many architects who, having blindly entered into competition, when they found themselves deceived, consoled themselves that their names were not made public, fell back on their more certain dependance, and resolved never more to waste time by entering into competition, unless they had some *certain interest* with the parties; and instead of stepping forward and calling around them their fellow sufferers, to probe the matter, they feared to mix themselves up with those beneath them, or to be regarded in the light of disappointed persons. So we go on from year to year, and competition is now become as a snare laid by the fowler to catch hungry small birds only; for in four cases out of five if the prize is not awarded to some favourite, it is sure to be given to some person who has studied the art of making bad compositions pleasing to the eye, and blinding the umpires with a few splashes from their brush.

I beg to suggest to the profession, to form a society, to be named "the Anti-competition Association," and to address every member of the profession in the United Kingdom, requesting their signature to the principles of the society, and that of all persons employed under them; viz. never to engage in any competition in which security is not guaranteed, that impartial justice shall be done in awarding the premiums, and naming the judges who are to decide on the respective merits of the designs submitted; and, at the same time, some architect of high standing as a referee in case any doubt should arise.

These thoughts have been called forth by my having recently entered into a competition for a lunatic asylum for the county of Somerset, and devoted a whole month in making the drawings, having no person to assist me. The manner in which the affair has been conducted is, to say the least, to me full of mystery! In the first place, the advertisement required a design for a lunatic asylum, including farm-buildings, lodges, estimates, and specifications, and a personal inspection of the site; all to be done in the space of fourteen days, in the depth of winter. After repeated applications from many architects to extend the time, they consented, within two days of the date fixed, to allow a month longer; but, at the same time, requested those gentlemen who had prepared designs to send them in by the time first stated. (Query: for what purpose, after the extension of the time?) I determined on competing. My drawings, and I presume those of the other competitors, were sent back in five days after delivery, accompanied with a printed circular; consequently no public exhibition could have taken place. I have written two letters, one to the committee, and one to the clerk of the peace, requesting to know the names of the successful competitors, and of the visitors, and am refused any information on the subject. Should any of your numerous readers think, like myself, that justice has not been done in this case, and be able to give any information on the subject, by so doing they will oblige a subscriber to your work, who is

A Freeholder of the County of Somerset, and a Freeman of the City of Bristol.

March 14th, 1845.

COMPETITIONS—THE CLIFTON UNION.

Sir,—Architectural competition is a subject entertained by a great number of your readers, and it would be conferring a favour on me, as well as many others, if you would make public what has transpired in the *Clifton Union* competition, or whether it is yet made known who the successful architect is. We hope better things of this than the generality of competitions.—I am, Sir, &c.,

A Subscriber.

COMPETITIONS—HOLLOWAY CONGREGATIONAL CHAPEL.

Sir,—In answer to the inquiry of "A Competitor" and for general information, I beg to state, that the successful competitors in the Holloway congregational chapel competition are Messrs. Emmett and Chadwick of the Adelphi, whose plans are stated to have been distinguished by the *letters* E. D. O. (See The Builder, No. 106, page 84.)

The committee have refused to exhibit the drawings (even to competitors), and have declined to give any further information.

Should any of your readers be acquainted with more particulars, I (and no doubt the rest of the disappointed) shall feel obliged by their giving them publicity.

At the same time, I would suggest that in this, and all similar cases, the remedy is in a great measure in the hands of competitors themselves. *Let them all unite to exhibit their designs themselves*, and surely the successful candidates would (if for no purer motive), for very shame join them.

I am, Sir, &c.,

Another Competitor.

March 17th, 1845.

BUILDING SOCIETIES.

Sir,—I have carefully reviewed the whole of Mr. Wiltons remarks on this subject which appeared in your journal, and, in my opinion, they have left the question in a worse position than it was; for this reason—in defiance of the positive evidence of such societies having been in successful and beneficial operation at Liverpool for nineteen years, Mr. Wilton denounces them *in toto*; and that upon assumed grounds as thoroughly erroneous as the fallacies he proposes to expose. You have termed it an "abstruse subject;" for such a reason, would it not be a disgrace to the intelligence of the present day that these societies should not be placed upon an intelligible footing? Mr. Wilton has evidently bestowed much attention on the matter; and agreeing as I do with him that the London and Westminster society is a most thorough bubble, he has not touched one of the practical objections to it; and it appears to me to be quite open to any advocate of that society to shew that he has created giants to slay them,—having assumed as data, propositions that have no existence in their scheme. If this be true, it must, to a great extent, relieve from blame those respectable parties who have lent their names to these bubbles, it being aside their habits to investigate an "abstruse subject" even to the extent Mr. Wilton has done. It is evident, that however palpably incorrect the statements of an opponent may be, if the subject is intricate and the arguments used as intended to prove the fallacy are themselves open to objection, the hand of the opponent is thus strengthened. I probably should have been unable to divine the whole matter had I not adopted the course of going down to Liverpool and thoroughly investigating the subject. My objections to many of the details are just as applicable to the Liverpool as to the London societies, and at Liverpool were by intelligent men, admitted as objections.

My object is to propose the *juste milieu* between existing details and the intention of the legislature. Without entering into any details of figures (although I have made millions upon the subject) which are oppressive to the minds of parties unaccustomed to such details, I will confine myself to the evident broad objections of the London bubbles, charging with positive blame those who have with knowledge put forth such erroneous statements. I will, therefore, in this letter, only put forth such a statement as to period of duration (the broad charge against the London societies) that the commonest understanding may comprehend. If comprehended and admitted to be true, parties may then be imperceptibly led into further development of details, as a glimmering of truth (which you seek) will lead to an interest in a further discussion. These societies were intended for the benefit of our humbler neighbours, and, under proper regulations, would be highly beneficial. Such parties receive as true, statements sanctioned by respectable men.

The history of the transaction, as by the prospectuses proposed to them (for the moment putting aside the 101 other fallacies), is this: they are told that a certain amount will be advanced to enable them to buy or build a house upon an annual payment per share, of which 6*l.* is termed subscription, and 2*l.* 8s. redemption. I contend that this is neither more nor less than an annuityof 8*l.* 8s. A party granting an annuity naturally inquires the period for which it is to be paid, before he decides the amount (controlled by the discount he bids) he is content to receive in respect thereof. The parties upon whose dictum he depends distinctly declare ten years; and in some prospectuses, to establish the fact, a quotation is made thus:—"The following is an extract from the tenth and final report of the Liverpool Building Society, which terminated successfully in ten years from its commencement." I admit it terminated in ten years, but what were the conditions of this society? Is it not intended, an inference should be drawn, that they were *pari passu* with the proposed London Societies? What were the facts? In this quoted Liverpool Society, the monthly payments were 12s.; redemption-money, 8s., and thirteen payments, or lunar months, to the year. So that a party borrowing in the Liverpool society, paid an annuity of 13*l.*, whilst a member of a London society would pay only 8*l.* 8s., the value of shares in each society being 120*l.* This having been put forth with knowledge of the facts, would appear to be little short of a fraud. I will endeavour to elucidate this by a very simple operation of figures, and for the present there leave the question, with this remark, that the error into which Mr. Wilton and others appear to have fallen is, treating it as a purely financial question. Upon such a ground it needs no lengthened argument or complexity of figures to prove that parties proposing to lend money at 4 per cent. cannot by any process have a return made to them of their capital in ten years with 20 per cent. per annum profit. There is no doubt that these societies were originally established upon a rational theory of mutual benefit; accomplishing, by the combination of numbers, that which was impracticable for individuals. If your columns are permitted to be open to the subject, I pledge myself to prove to demonstration, that such societies may be formed upon, and existing societies conformed to, scientific and mathematically correct principles. The course I propose to adopt would be to point out the objections to existing details *seriatim*, and suggest the remedy, without embarrassing the subject with complexity of figures.

I am, Sir, &c.,

G. R.

COMPARATIVE STATEMENT OF REVENUE OF THE TWO SOCIETIES.

	£. s. d.	£. s. d.	£. s. d.
Liverpool Society.			
300 Shares, 13 months, at 12s., or 7*l.* 16s. subscription	.....	2,340 0 0	
For years	.....	10	
			23,400 0 0
200 borrowers during first six years; additional redemption 8s. per share, or 4*l.* 16s. per annum.	.....	960 0 0	
For an average of years	.....	7	
			6,720 0 0
Total revenue	.....		30,120 0 0
London Society.			
300 members, 12 months, at 10s.; 6*l.* subscription	.....	1,800 0 0	
For years	.....	10	
			18,000 0 0
200 borrowers, during first six years additional redemption, 4*l.* or 2*l.* 8s. per annum	480 0 0		
For an average of years	7		
			3,360 0 0
Total revenue	.....		21,360 0 0
Revenue in favour of Liverpool Society	.....		8,760 0 0

It will be perceived that with nearly 41 per cent. less revenue, the London society proposes to accomplish similar results in a like period. In the Liverpool society eighteen members only received 120*l.*, and the evidence is distinct, that borrowing ceases at the end of six years.

[We have already devoted so much space to this subject, that we cannot comply with our correspondent's request. If "the objections to existing details" are not already known by our readers, they never will be.—Ed.]

FURNITURE TO ACCORD WITH THE BUILDING.

Sir,—Observations contained in a recent number of your publication lead me to think that an account of the manner in which the Conservative Club-house has been furnished, will be gratifying to your feelings as a man of

taste, and a zealous advocate of consistency in design and architecture.

The committee of the club has just set an example highly creditable to the order to which it belongs, and which is calculated, if followed by other bodies, or by wealthy individuals, to encourage the art of design more than any thing that has yet been done in this country.

Disregarding the old practice of allowing upholsterers to give designs, they, instead, employed and paid a professional artist to make the required drawings, under the direction of the architects of that mansion; and the result has been eminently successful, the furniture being thoroughly in keeping with the architecture, and contributing greatly to the effect and beauty of the interior, according to the opinion of every visitor.

The novelty of this plan forms a striking contrast to the principle laid down by a committee of Parliament, appointed to examine the charges for the furniture of Windsor Castle, manufactured by Messrs. Seddon; they struck out all charges for designing and drawings, setting forth as a reason that a manufacturer should be his own designer. Comment is superfluous—but the result was most mischievous, and most injurious and degrading to designers, for manufacturers could no longer charge for designs without fear of having them struck out of their estimates or charges; besides every manufacturer was, as it were, privileged by Act of Parliament to consider himself a man of taste and a qualified designer, and quite independent of professional artists.

However, brighter days are at hand, and the public begin to be sensible of the fact, that many years of hard study in the art of design, and exclusive attention to it, can alone make a designer.

I am, Sir, &c.,

40, Brompton-square. H. Whitaker.

Miscellanea.

Decorative Art Society.—On Wednesday, the 12th inst, a paper was read by Mr. Dwyer "On the interior decorations of the Royal Exchange." He referred to a former paper read in December last, and contended that the decorations did not improve upon further acquaintance; that the ceilings and walls contrasted painfully with the floor and pilasters; and that, admitting the style of decoration to be an approved taste, this incompleteness in such a building was much to be regretted. He suggested that an ornamental or a mosaic pavement in the ambulatories, comprehending in its design decided lines assisting the perspective, would tend to improve the whole effect of the interior. That the walls might have been adorned with representations from the history of commerce—such as the signing of important treaties, or by portraits of celebrated men, who have been connected with the rise and progress of our commercial greatness; and that these works ought to have been by our leading English artists, as offering to them a public gallery for their productions. A question was put respecting "the vehicles used for the wax or encaustic painting" at the Exchange, but no satisfactory reply was obtained, and information was again solicited upon this important point, which, in fact, marks the distinction between *encaustic* and *distemper* painting, between durability and that which is not durable. The invention (patented by Mr. Dicksee), of compressed glass mosaics for pavements, for mural decorations, or for furniture, was explained, and some beautiful specimens exhibited in the room; this led to some further remarks on the exclusiveness of the Gresham Committee, to whom this inventor had applied to be allowed to shew his specimens, but no notice was taken of the request. It was thought that had there been a competition afforded to artists generally, much better results in the decorations of the Exchange would have been realized.

City Bricklayer.—A vacancy having occurred in this appointment, caused by the death of Mr. Cartwright, several parties have announced themselves as candidates. The appointment is in the gift of the lord mayor, aldermen, and common council, and when contested is determined by vote.

The Electric Telegraph.—The speed of railway communication, wonderful as it seems, is infinitely eclipsed by another nobler invention, the gift of science to the useful arts, and which may be pronounced little less than miraculous; we mean the electric telegraph. A motion made at one end of the line, extending from London to Portsmouth, a distance of 88 miles, was conveyed to the other without any sensible lapse of time. It is not doubted that by similar apparatus, consisting simply of wires with powerful magnets at each end, intelligence could be conveyed in the same instantaneous manner from London to Edinburgh, or Inverness. The expense for the 88 miles was only £24,000, or rather less than £300 per mile. There is little doubt that they will be extended to all the more vulnerable extremities of the land; and it is easy to see how vastly this beautiful invention, combined with railways, will add to the security of the kingdom, both from foreign invasion and domestic insurrection. The electric wires, extending over the island, may be compared to the nerves ramified over the body, which give instant notice of the slightest movement in the most distant member. The government seated in the sensorium will enjoy, when danger threatens, a sort of omnipresence. It will be able to communicate with the remotest parts in a few seconds, to know what is passing in these parts, and to direct, without the loss of an instant, the measures which the conjuncture requires. The danger known, the railways furnish immediate and gigantic powers to meet it. With their aid, a march, which in former times occupied a month, is contracted to a day; and supposing ten thousand soldiers to be stationed in London, they could now be sent to York in less time than would have been spent on the march to Windsor seven years ago.—*Scotsman*.

Pressing Workmen.—Our contemporary the *Literary Gazette* says, a curious document has been lately published by the Comité Historique of Paris, concerning the completion of the Louvre and the Tuileries. It belongs to M. A. Lenoir, and was once in the office of the Grand Provost of France. It appears from this paper that all masons and other handicraft men could be forced to work upon the king's buildings, by order of the provost, to the exclusion of all other buildings, which they were obliged to abandon for the time being. The king (Louis XIV.), after ordering all due preparations to be made for the collecting of stone, &c., commands that, while these palaces shall require the aid of a considerable number of hands, no workmen in Paris shall be allowed to work on any other edifices whatever; and further, that no person shall presume to erect any building in Paris and within ten leagues round, under penalty of 10,000 livres fine for the first offence, and the galleys for the second. It is observed that in certain cemeteries of France—and it is known to have been especially the case within the cloisters of monasteries — there exist lofty crosses of stone, with a stone pulpit attached to them. This cross is styled the Hosannah cross, because on Palm-Sunday a procession was made thither from the church; certain prayers were offered up there, and the "Hosannah" sung.

Enlargement of King's College Hospital.—A public meeting was held on the 13th instant, at Willis's Rooms, King-street, St. James, under the sanction of the council of King's College, for the purpose of originating a subscription for the above object. His Grace the Duke of Buccleugh presided, and was supported by the Bishops of London and Lichfield, Lord John Russell, Sir Robert Inglis, the Governor of the Bank of England, Mr. Alderman Copeland, &c. 15,000*l.* is the sum required to complete the increased accommodation proposed. The contributions announced at the meeting amounted to upwards of 2,000*l.* The Queen sent a donation of 100*l.*, and the Queen Dowager one of 150*l.* There still remains to be raised 13,000*l.*

Royal Commission of Fine Arts.—In consequence of applications from sculptors requesting to be allowed to exhibit in Westminster Hall specimens of their art, a notice has been issued inviting artists to send models for statues or groups, during the first week in June next, to Westminster Hall, to be there exhibited, subject to the regulations and conditions which were published relative to the former exhibitions.

Railway under the Thames.—At the annual meeting of the proprietors of the Thames tunnel, held last week, the chairman, in answer to a question whether there was any truth in the report that a proposition had been made for the construction of a railway through one of the adits of the tunnel, stated that "A plan was submitted by the late Mr. Samuda, who proposed to form a railway through the tunnel, for the conveyance of carriages and carts, one side being for foot-passengers, and another for vehicles. The apparatus for the railway would cost about 10,000*l.* When it was sufficiently matured, the plan would be laid before the proprietors.

Master Carpenters' Society.—A meeting of this society will be held at the Freemasons' Tavern, on Wednesday evening, the 26th instant, when, the usual business being disposed of, new members will be admitted. Several of the clauses in the New Buildings Bill will be brought before the board and discussed.

Art Union of London.—We draw the attention of our readers to the advertisement of this widely-spread institution in another part of the journal. The subscription lists will be closed on the 31st inst., and the general meeting for the distribution of the funds will be held on Tuesday, the 22nd of April.

NOTICES OF CONTRACTS.

[We are compelled by the interference of the Stamp Office to omit the names of the parties to whom tenders, &c., are to be addressed. For the convenience of our readers however, they are entered in a book, and may be seen on application at the office of "The Builder," 2, York-street, Covent-garden.]

A Plan, Specification, and Estimate, for a Pier, Slip, or Jetty, to be erected at Weston-super-Mare, Somerset. Twenty-five guineas is offered for the most approved plan. March 24.

For the supplying and erecting a Water-tank for the Sheffield and Manchester Railway Company. March 25.

For supplying her Majesty's several Dock-yards with Riga Hand Masts and Fir Timber, Dantzic Deck Deals and Fir Timber, and Norway Spars. March 28.

For the erection of Waiting-rooms, &c. for a Steam-boat Pier, at the Market-quay, Blackfriars-bridge. March 28.

For supplying the Commissioners of the Great Dover-road district, Newington, Surrey, with the best-tooled York Paving-stone, and the best Guernsey Granite; also for labour and mortar in taking up, squaring, and relaying old pavement-stone. March 28.

For the supply of 11,000 feet of nine-inch cast-iron Pipes for a new line of Aqueduct to be laid in the Island of Malta. March 31.

For the supply of Rails and Chairs for the Eastern Counties Railway. March 31.

For the erection of a new Workhouse at Stratton, St. Margaret, about Midway between Swindon and Highworth, Wiltshire. April 2.

For certain repairs to Snake Bridge (over the River Alde), Suffolk. April 2.

For Lighting Camden-town, St. Pancras, with coal-gas for five years, from the 24th of June next. April 3.

For the erection of a Church in the parish of St. Thomas, Winchester. April 5.

For the erection of a Church, in the parish of St. Thomas, Winchester. April 5.

For cutting, forming, and completing a new line of Private Carriage-road, one mile in length, from Whitehaven Castle, Cumberland, the seat of the Earl of Lonsdale, to the Turnpike-road, between Bransty toll-bar and Lonsdale-place, near the town of Whitehaven. April 7.

For constructing the fourth division of the Great Southern and Western Railway. April 8.

For about 250,000 Railway Sleepers not less than 9 feet long, for the Chester and Holyhead Railway. April 9.

For erecting at Alresford, Hants, between five and six thousand feet superficial of new Brickwork, to be either neat flat, joint-pointed with white mortar, or neatly tuck-pointed. The parties to find labour and the erection of scaffolding only. April 10.

For the restoration of the Parish Church of Grays Thurrock, Essex. April 12.

For submitting a plan of a Tread-wheel, and constructing the same in the Common Gaol of Great Yarmouth, Norfolk. April 24.

For all the Works to be done in the erection and completion of the new cast-iron Bridge over the Haven of Great Yarmouth, including the finding of labour, certain materials, &c. April 26.

For the construction of the third and fourth divisions of the Chester and Holyhead Railway. April 28.

For the supply of 11,000 feet of 9-inch cast-iron Pipes for a new line of Aqueduct in the Island of Malta. April 30.

For new-paving parts of the parish of St. Mary, Islington, Middlesex; and for repairing and keeping in repair the paved Footways belonging thereto, for one year from Lady-day next. Also for supplying unbroken Guernsey Granite, Core, Ballast, Gravel, and clean Flints.

For the execution of the Works necessary for the Drainage and Improvement of Lough Carrib, in the counties of Galway and Mayo.

For the supply of Rails, Chairs, Sleepers, and Bolts, for the Taff Vale Railway.

COMPETITIONS.

Plans, &c., for the erection of a Commercial Middle School in connection with the committee of the Manchester Church Education Society.

APPROACHING SALES OF WOOD, &c.

BY AUCTION.

March 24.—At Bradley's Wood, Halsted, Essex: 500 good Fir Trees; 5,700 capital Hurdle and Hop Poles; 54 Loads of Wood, &c.

March 24.—At Drayton, Somerset: 240 Oak Trees, almost the whole of which are sound clean Timber of superior quality.

March 27.—At the Hyde, Edgeware-road: 37 Butts of fine Elm Timber, felled and lying by the side of the Edgeware-road.

March 28.—At Garraway's Coffee-house, Cornhill: 350 loads of Red Pine Timber; 700 loads of Baltic; 10,000 Colonial Deals; and 10,000 Baltic and Swedish Deals.

March 28.—At Moor-house Farm, Denham, Bucks: 3,591 Oak Trees and Saplings; 220 Ash; 136 Cherry; and 3 Alder Trees.

March 28.—At Kesgrave Hall, Suffolk; Ash, Elm, and Birch Trees, Elm Pollards, Stock Birch, Elm, Chesnut, and Alder Stands, and other Poles.

March 31.—At 7, Store-street, Bedford-square; several thousand Yellow Deals, Pine and Spruce ditto, Battens, Planks, and Boards, Ash Felloes and Planks, and other seasoned Wood.

March 31.—At Down Hall, Bradwell, Essex; 310 Oak Timber Trees, standing with Top, Lop, and Bark; 213 Ash, 157 Elm, and 78 Beech Trees.

The last week in March, or the first week in April next.—A large quantity of Oak and Elm Timber, of superior quality and large dimensions, principally growing in the woods on the Orchardleigh Estate, near Frome, Somerset.

By Private Contract, before the 1st of April next.—287 Oak Trees, of full growth and large dimensions, suitable for all purposes, now standing at Woodside, near Morland, Westmoreland.

April 1.—At Chelmsford, Essex; a very valuable, extensive, and well-assorted stock of Dry Wood in great variety, comprising fine Spanish and Honduras Mahogany, mostly cut between six and seven years; particulaly fine Zebra Wood, English Oak, Pencil Ceder, Birch, Beech, Elm, Rosewood, &c.

April 3.—At Whitley, near Baythorne End, Suffolk: a large quantity of Fir Timber.

MEETINGS OF SCIENTIFIC BODIES

During the ensuing week.

MONDAY, March 24. — *Medical*, Bolt-court Fleet-street, 8 P.M.

TUESDAY, 25.—*Medical and Chirurgical*, 53, Berners-street, 8½ P.M.; *Zoological*, Hanover-square, 8½ P.M.

WEDNESDAY, 26.—*Pharmaceutical*, 17, Bloomsbury-square, 9 P.M.; *Ethnological*, 27 A, Sackville-street, 8 P.M.

THURSDAY 27.—*Numismatic*, Somerset-house, 7 P.M.

SATURDAY, 27.—*Westminster Medical*, 32, Sackville-street, 8 P.M.; *Institute of the Fine Arts* (Society of Arts), Adelphi, 8 P.M.

TO CORRESPONDENTS.

"An Old Surveyor," "Vigil," *and* "W. H." *will find an answer in our leading article.*

"Architectural Drawing Schools."—*We often receive inquiries as to the best school, and are unable to afford satisfactory information. We should be glad to learn what establishments of this kind there are in the metropolis.*

"B. F." (Minories).—*There is no such class at present.*

"H. N."—*We shall be happy to receive his communication on the subject of Limes.*

"A Constant Subscriber" *must give notice to the district surveyor before any chimney-stack or flues be pulled down, cut into, or altered.*

"R. B. W." (King's Langley) *is thanked for the offer of his very nice drawing. We regret that we cannnt avail ourselves of it, having already provided similar examples. We hope to hear from him again.*

"W. P." (Woodbridge).—*We are indebted for his enclosure, but consider the subject hardly of sufficient importance to be engraved. It is left as directed.*

"R. B. R." (Fleetwood).—*We thank our correspondent for the sketch, but cannot promise at this moment to engrave it. The ordinary mode of obtaining copies of "brasses" by means of heel-ball, is cleaner and more simple than that suggested by "R. B. R."*

"G. P." (Preston) *is thanked. The drawing shall be engraved shortly.*

"R." (Sudbury).—*The fluid to supersede Indian ink, of which he asks, is sold by Stephens, 54, Stamford-street, Blackfriars-road. We cannot answer for its goodness, not having tried it.*

"Herne-hill Church Estimate."—*The insertion of "Mr. Broomfield's" letter would subject him to an action at law: we must decline doing so.*

"H. W." (Brompton).—*We shall shortly examine the building in question, and shall probably be glad to avail ourselves of the offered tracings.*

"One of the Competitors" (Holloway Chapel).—*We cannot listen to anonymous charges without proof.*

"A Plasterer" *and* "W. G. Lock."—*Next week.*

"N. B." *wishes to know if Windsor Castle will be open to the public on Whit-monday.*

"H. C."—*The question is too general for us to answer.*

"Clay for Modelling."—*Mr. Dalton wishes us to state, the clay mentioned in our last number was first used for modelling by Mr. Sangiovanni.*

"Scrutator's" *communication is declined with many thanks for kind intentions. It is left for him at the office.*

Received.—"C. E. G." "E. G. B." (Oxford); "P. T."; "A Fair Tradesman," *and "The Illustrated Family Journal, No. 3." A good two-penny-worth.*

ADVERTISEMENTS.

EMBARRASSED CIRCUMSTANCES. —PERSONS IN DIFFICULTIES being desirous of availing themselves of the Benefit of LORD BROUGHAM'S HUMANE ACT, are requested to apply to MESSRS. GRAND AND CO., of 54, Coleman-street, City, where every information may be obtained, FREE OF EXPENSE, or arrangements can be made with Creditors, by which means the painful necessity of resorting to BANKRUPTCY or INSOLVENCY may in many cases be avoided.—N.B. Partnership accounts adjusted.

TO BUILDERS and Others.—A cheap substitute for high priced bricks, well worthy the attention of speculative gentlemen, and other capitalists who intend building this season. This article is stone, which may be worked with great advantage. It is in pieces from 3 to 5 inches in thickness, and averaging from 14 to 20 pounds in weight; it is about the same weight as bricks, and will be sold in London at 12s. 6d. per ton. Any quantity may be had from 100 to 200 tons per week; not more would be guaranteed per week, as it will come by railway. A fair sample of 10 or 12 tons may be seen at the proprietor's at any time.—Address, JAMES PERREN, 1, Victoria-place, Surrey-square, Walworth.

TO UPHOLSTERERS, CARPENTERS, BUILDERS, and CONTRACTORS.

		s.	d.
Furniture cleaned and glazed	per yard	0	1½
Lined ditto ditto		0	2½
Sofa and Chair Covers at equally reduced prices.			
Linings cleaned and dyed all colours (Pink excepted)		0	3
Pink and Rose colour		0	4
Moreen cleaned, and watered or embossed to elegant patterns		0	4
Ditto re-dyed		0	6
Silk Damask cleaned and finished		0	6
Ditto ditto dyed all plain colours		0	8
Ditto ditto scarlet and crimson in grain		1	0
Window Blinds cleaned and calendered		0	3
Blankets cleaned from	4d. to	1	6
Counterpanes from	„ „	1	0
Carpets cleaned and hotpressed	per yard	0	4
Mattress Cases cleaned, &c.,		2	0

AT CALDWELL, AND CO.,

SILK DYERS, SHAWL AND FURNITURE CLEANERS, EMBOSSERS, &c.,

54, Mortimer-street, Cavendish-square.

Furniture taken down and re-made. Letters punctually attended to, and all goods delivered within the week. Please to copy the Address.

PAINTING BRUSHES OF SUPERIOR QUALITY. TO PAINTERS, BUILDERS, &c.

J. J. KENT AND CO.,

MANUFACTURERS,

11, GREAT MARLBOROUGH-STREET, LONDON,

Offer to Painters, Builders, &c., Painting Brushes of a quality far superior to those generally offered for sale, to which they beg to call the attention of all who prefer quality and durability to apparent cheapness.

oooooo.—7 in. Dusters.
oooooo.—7 in. ditto, extra.
oooo.—Ground Brushes.
Plasterers' Brushes.
Distemper ditto. Ground and Unground.
Sash Tools, and Common Tools.
Tar Brushes and Masons' Brushes, and all other Brushes used by Painters and Artists.

Lists of Prices of Painting Brushes, and of all other kinds of Brushes, forwarded on application. Established 1777.

E. WOLFF & SON'S

NEWLY-INVENTED

MATHEMATICAL PENCILS,

FOR

METHEMATICIANS, ARCHITECTS, & ENGINEERS,

Warranted to retain a very fine Point.

E. WOLFF AND SON, in introducing their Extra Hard Lead Pencils for Mathematical and Architectural purposes, beg to draw attention to the advantages resulting from their adoption in preference to the ordinary Pencils. They are made to six distinct sizes, by which means they can be fitted to all instruments, and are so constructed that each Pencil may be cut in halves without waste; thus making two Pencils each of a length, and most convenient for use, and obviating the difficulties existing with respect to the ordinary Pencils.

E. W. and Son have also half-round Pencils, suitable for the Spring Bow, thus preventing the necessity of dividing the Pencil down the centre. They are made of extremely Hard Lead, of the finest quality, which will retain a very fine point and give a clear, even, and distinct line.—Price 4s. per dozen.

PATTERN OF SIZES.

½ round 1 2 3 4 5 6

A Sample of each size will be sent by Post to any part of the Kingdom, on the receipt of Postage Stamps equal to the amount.

Drawing Pencils of the best quality, for Architects and Engineers, warranted free from grit: the HHH and HHHH are particularly recommended.—Price 5s. per dozen.

May be had of all Instrument Makers and Stationers, and at the Manufacturers', 23, Church-street, Spitalfields, London.

WALLIS'S PATENT LIQUID WOOD KNOTTING. — This newly-discovered Liquid Composition which Messrs. Geo. and Thos. Wallis have the satisfaction of introducing to the trade, possesses the important qualification of effectually stopping Knots in Wood, however bad, and preventing them eating through and disfiguring the paint above.

Many substances have been used and much time spent in endeavouring to find a cure for a bad Knot, but hitherto without success. Messrs. Wallis therefore feel much pleasure in offering to the public an article so long and anxiously called for.

In the application, skill is not required; a boy can use it as well and effectually as the best workmen: it is put on to the work with a brush like common paint, can be used in all climates and situations, and does not require heat.

Sold wholesale and retail, by Messrs. G. and T. Wallis, Varnish, Japan, and Colour Manufacturers, No. 64, Long Acre. Price 20s. per gallon,

VARNISH.—It has long been a desideratum amongst the consumers of Varnish to obtain a good and genuine article; brilliancy, facility of drying, hardness, and durability are the qualifications necessary, but these are seldom if ever found united. The experience of a life-time devoted exclusively to the manufacture of this article, the great and important discoveries of modern chemistry, and the daily improvements in machinery, have enabled Messrs. George and Thomas Wallis to produce Varnishes (both oil and spirit) unrivalled in every respect, and they confidently recommend them to the trade, as deserving of notice both in price and quality.

Builders, Coachmakers, Painters, and others may depend on being supplied with a genuine and unadulterated article, Fine Oil Varnish, from 10s. per gallon; best White Spirit Varnish, 21s. ditto; Best Spirit French Polish, 20s. ditto; White Lead, Oil, Turps, and Colours of every description at the very lowest prices.—WALLIS'S Varnish, Japan, and Colour Manufactory, 64, Long-acre, one door from Bow-street. Established 1750.

HIP TILES to suit slate roofs in colour; Ridges, with plain or rebated joints, roll tops, and vertical ornaments; drains, many sizes, with plain or socket joints; paving in squares, hexagons, octagons, &c., different colours; roofing, in Grecian or Italian styles, other devices also, or plain; conduits, which do not injure pure water; fire-bricks and tiles; clinkers, and out-door paving; sundry wall-coping, garden-borders, chimney-tops; also tubular and other flues of peculiar material. No agent, but a depôt at WHITEFRIARS, and 22, WATER-LANE, FLEET-STREET, LONDON, under Mr. PEAKE'S personal care, to supply genuine TERRO-METALLIC goods at fair prices as per quality.

The TILERIES, TUNSTALL, STAFFORDSHIRE, are near the centre of England, whence boats are sent direct to any inland place; or to the Mersey for the coasts, the colonies and elsewhere.

HATCHER'S BENNENDEN TILE-MACHINE, Manufactured and Sold only by COTTAM and HALLEN, Engineers, Agricultural Implement Makers, &c., 2, Winsley-street, Oxford-street, London.

This is the most efficient Machine that has been invented for the purpose of making Drain Tiles. Any shaped Tile can be made by merely changing the die, which can be done in a few minutes. It requires but few hands, viz., one man and three boys. With this amount of labour, the product of a day of 10 hours is as follows, viz:—

1 inch diameter of Tile,	11,000
1½ „ „ „ „	8,000
1½ inches diameter of Tile,	5,800
2½ „ „ „ „	3,200

The Machine is moveable down the drying-sheds, so that it requires no extra boys to carry the Tiles, nor are shelves required in drying. It has been in full operation for upwards of four months at Hempstead Park, near Cranbrook, Kent. No charge made for Patent dues or licence. The purchase of the machine includes free use of it.